He Flew Faster Than Sound

FLYING

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DOUGLAS SKYROCKET

Holder of the world's speed and altitude records—page 13

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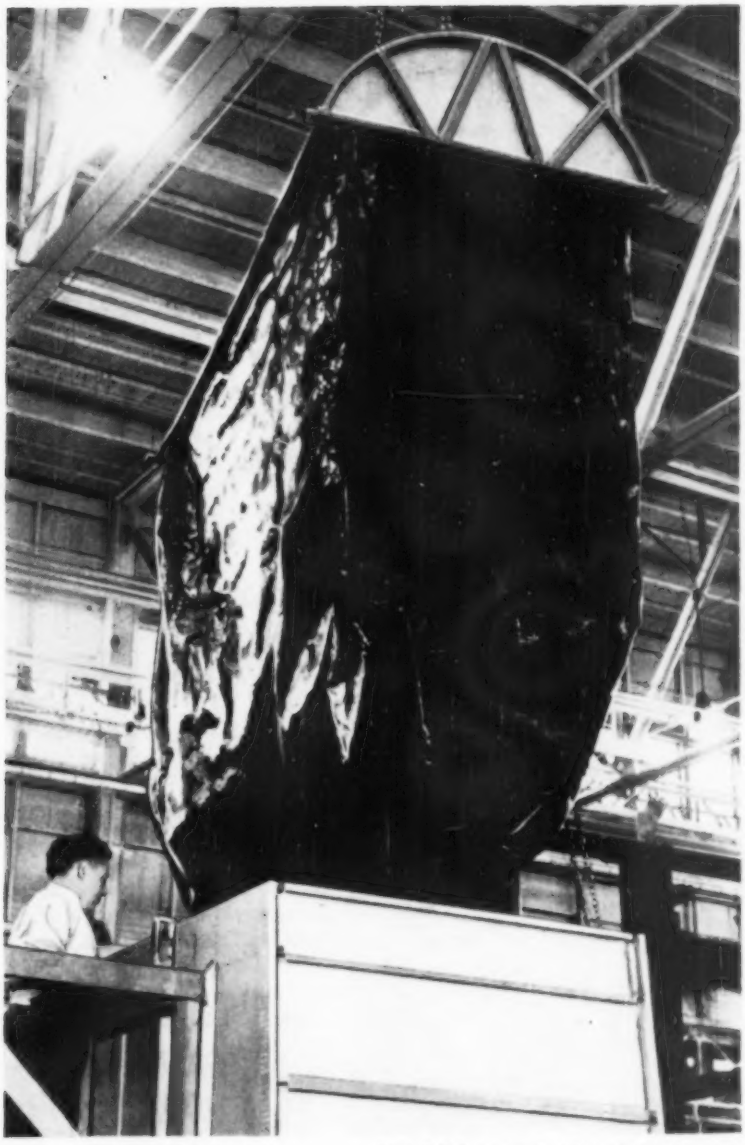

Pliocel—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

Here a 3,000-gallon PLIOCEL is being fitted into a metal shell designed and built by Goodyear Aircraft Corporation for Convair B-36's. Such a combination of cell and metal fabrication experience is found only at Goodyear. This mammoth PLIOCEL weighs only 35 pounds, which is slightly more than one pound per 100 gallons—far below any other type of aircraft cell.

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THE COVER: Test Pilot Mays raising cockpit cover of the Douglas Skyrocket.

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FLYING

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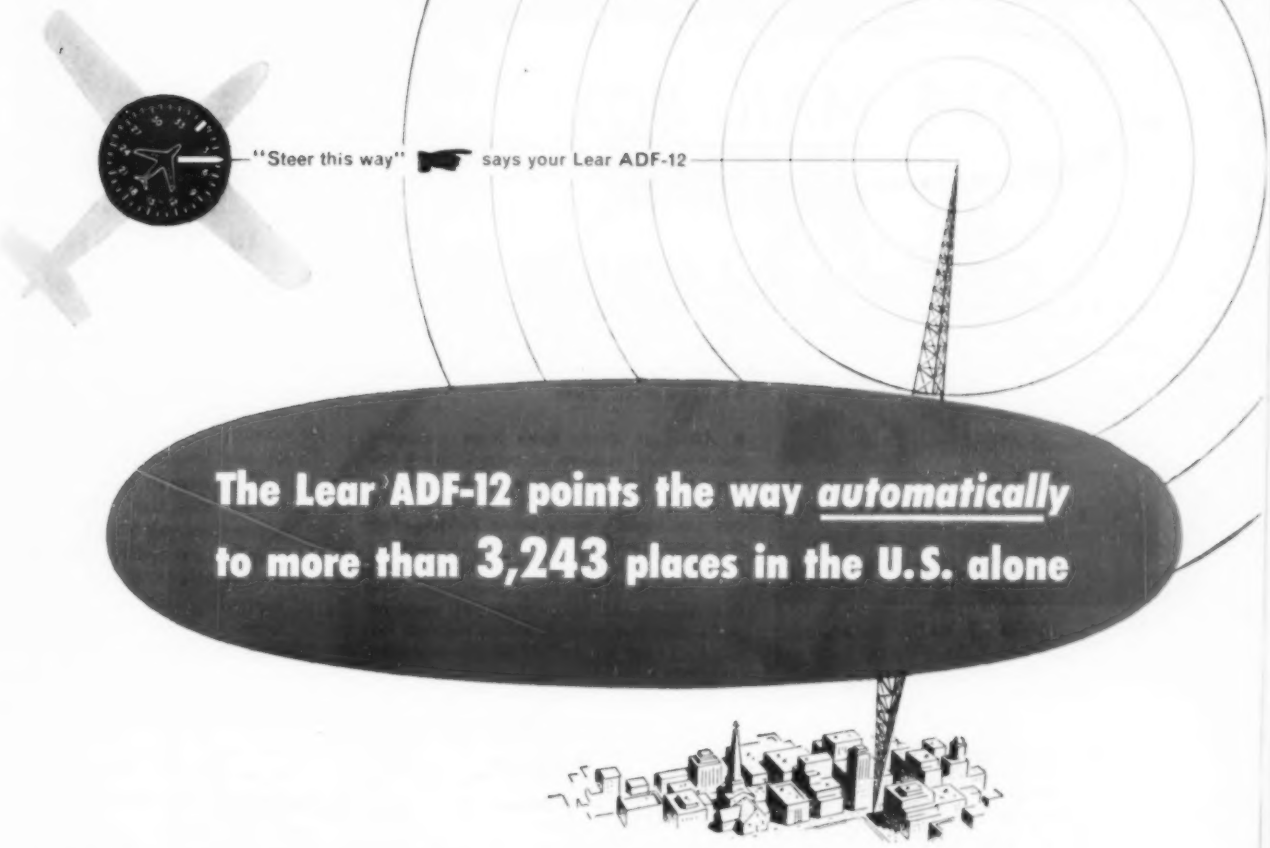

The Lear ADF-12 points the way *automatically* to more than 3,243 places in the U.S. alone

In every city and just about every town of any consequence in the United States you will find a radio station on which you can home easily, positively, and automatically with your Lear ADF-12.

For example, your Lear ADF-12 automatic direction finder will steer you to 2,077 commercial broadcasting stations; 378 CAA low frequency radio ranges; 131 CAA radiobeacons; 150 marine radiobeacons; 161 CAA control towers (by homing on their carrier waves); 124 ILS compass locators (situated immediately adjacent to the runways of all major terminal airports; 110 Air Force low frequency radio ranges and towers; 85 Navy low frequency radio ranges and towers; 27 municipal and private low frequency radio ranges and towers.

Moreover, there are additional thousands of stations in Canada, Mexico, Alaska, Central and South America, and Europe on which you can home with your ADF-12.

Navigating with your Lear ADF-12 is incredibly simple. Here is all you have to do to reach your destination: 1. Tune your Lear ADF-12 to the station you want to home on and instantaneously the azimuth indicator needle will point to the station. 2. Turn your airplane till the indicator needle points straight up. 3. Keep flying with the indicator needle in this position. When it swings around to the 180° position your station is directly below you.

The ADF-12 tells you not only *how* to get there—it tells you when you *are* there, eliminating all the usual worries about missed check points, low visibility, and finding the airport at the end of the trip when your gas is running low.

The Lear ADF-12 provides reception on three bands: 200-440 kc; 475-1050 kc; and 1000-1750 kc—thus making it a combined automatic direction finder, broadcast receiver, and radio range and communications receiver. It is extremely compact and light, yet rugged, powerful, and highly sensitive. It weighs less than 18 pounds—*less than the weight of three gallons of gas*—and can be easily installed in any type of plane from a Cub to a Connie. The price is only $695.* A special kit to simplify installation in your own particular plane is available at economical cost.

Write today for free illustrated booklet containing complete features and specifications of the Lear ADF-12.

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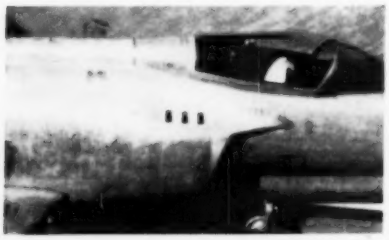
THE MAIL BOX

LOCKHEED F-90

What are those marks on the intake of the F-90?

LAWRENCE TANZI

Stony Point, N. Y.



● *The marks are measure boundary control openings which draw off the slow air and reduce friction and drag to a minimum.*—ED.

ANOTHER ORCHID FOR P AND B

I was surprised and delighted to read in the Flying Farmers section of your August issue that the Flying Farmers have nominated the P and B Flying Service of Pensacola as Airport of the Year.

I think it is an excellent choice. When my brother and I bought our first plane in October 1949, we were a little apprehensive about what we might be getting into in the way of trouble and expense for our Ryan *Navion's* upkeep. However, the fellows out at P and B made it the easiest thing in the world. They do everything for the plane, anticipate any trouble, and it is always in perfect shape whenever we want to go anywhere. And aside from the usual hangar rental, we have hardly spent a thing on maintenance, and yet everything operates perfectly. The plane is so clean that when we take it to other airports, people are very surprised to learn that it is a year a half old.

Of course, a good bit of this wonderful record can be attributed to the fine plane, but the fellows at P and B have certainly done their part to make plane ownership a pleasant experience.

ASHLEY D. PACE, JR.

Pensacola, Fla.

PRAISES AND HAZY PHRASES

Praises to a fine magazine and the wonderful job you're doing. My compliments also to Hy Sheridan. His sharp sense of humor and his interest and understanding of the problems of flying make his aritcles and notes something to look forward to.

However, this is primarily a letter of inquiry. In your August issue of FLYING, the author of "Eight Miles High—Without an Engine" speaks of "the voices" you're supposed to hear when flying over 40,000 feet.

Is that just some old flying "witch" rumor or are there definite reports of hearing intelligible voices other than from radio or a passenger about that altitude?

DEANE R. NICHOLS

White Salmon, Wash.

● *Although there have been scattered unconfirmed rumors of voices, there are logical explanations if such sounds are heard. Strange things happen to the air and the human body when subjected to the supersonic sphere. However, author William Ivans didn't hear voices.* Skyrocket *Test Pilot Bill Bridgeman, who flew higher and faster than any man, reports that not only didn't he hear voices, but he heard no sounds whatsoever.*—ED.

MR. LIGHT'S THROTTLED

It was very interesting to note the advice offered by Mr. Leonard M. Light, a novice pilot like myself, in The Mail Box of the July issue of FLYING.

After much concentration, I think I have a reasonable and sound solution regarding a creeping throttle, J-3 included.

While flying along in your J-3, slowly and without hesitation, remove your left hand from the stick or pull it out of your pocket and place gently on the throttle. Said hand should be on the throttle during all ground operation and during flight. Such action will definitely cure a creeping throttle, fluctuating tachometer, use of carburetor heat and any emergency actions or descent.

Anyway, who wants to go around in a J-3 with his thumb jammed down in the throttle quadrant? Not this novice!

S/SGT. ROBERT G. NELSON

Castle AFB, Calif.

● *Mr. Light's creeping throttle has brought all pilots creeping out of their planes to mail letters of advice. An unofficial tabulation has brought to Light that all are in agreement on the cure:*

KEEP YOUR HAND ON THE THROTTLE! Our editorial treble is raised in agreement.—ED.

(Continued on page 50)

Lockheed

SETS PACE IN CARGO FIELD

Look to Lockheed for the first cargo transport designed purely for turbo-prop power. It's the new L-206—answer to the U. S. Air Force request for greatly stepped-up range combined with speed, capacity and loadability.

Designed in 5 months the L-206 was the competition winner among 5 manufacturers. Far exceeding minimum specifications, it features numerous Lockheed innovations: a new streamlined full-rear opening for air drops... a pressurized cabin . . . clean interior, free of interfering protuberances . . . uniform tie-down fittings . . . integral loading ramp. The L-206 will have power conveyors in its truck-high floor, only 45" off ground.

What's going on at Lockheed?

Lockheed will whack into a billion dollar backlog when production starts in the newly opened plant in Marietta, Ga., now being tooled for the B-47 jet bomber. In Burbank assembly lines are being mechanized once again for faster jet production. New employees are being hired at the rate of 550 per week. Extensive plant expansion is now under way, including augmented facilities for advanced research.

What's being said about Lockheed?

AMERICAN AVIATION, July 9, 1951: "Constellations are now earning C&S (Chicago & Southern Air Lines) over 14c per plane mile before mail pay. Equipment reliability has been exceptional."

AERO DIGEST, June, 1951: "The Constellation, even after 12 years of life, is not now nearing the end of its cycle but is only on the edge of a virtually new era. When a company can produce an airplane for which it has a backlog of future production of 139 (April 1) units after 12 years, you know that that company has accomplished a major miracle of technical foresight, and that is, without flattery, the accolade of the Lockheed Constellation, one of the truly great airplanes of aviation history."

Leadership demands constant achievement

Every 80 minutes

a Lockheed Constellation sets a new record for dependability!

Over 30,000 times the *dependable* Constellation has crossed the broad Atlantic . . . setting a record of *more crossings than all other modern airliners combined.* And every 80 minutes a Constellation repeats the performance, piling experience on experience.

Twenty years of Lockheed leadership back every Constellation. Next time you fly, overseas or at home, go by *experienced* Constellation.

DEPENDABILITY IS A 20-YEAR TRADITION—dramatically illustrated today by the Lockheed F-80 *Shooting Star* . . . which has flown more Korean combat sorties than all other fighters combined.

MORE THAN SKIN DEEP—Stripped down, each airplane reveals the quality behind Lockheed dependability. Its thousands of precision parts are tooled to microscopic accuracy . . . a tribute to painstaking research, engineering, production.

Lockheed

AIRCRAFT CORP., BURBANK, CALIF.

Look to Lockheed for Leadership

MILITARY NEWS

MORE PUNCH FOR SAC

The long arm of the Strategic Air Command, the B-36, has been lengthened and strengthened. Newest modification of the big bomber rolled out of Convair's factory recently labeled B-36F, and with it came the announcement that it can fly "faster and at higher altitudes" than the B-36D. The "F" has a top speed of 435 m.p.h. plus and a service ceiling above the 45,000-foot mark. Like the "D," the "F" has four jet engines and six piston engines, but the latest model has more power. Horsepower of each piston engine (R-4360-53) is now 3,800, an increase of 300.

QUOTABLE QUOTATION

"We must face not only the fact that our existing Air Force is inadequate to back up our national commitments, but also the even more disturbing fact that our 95-group program will not give us enough air power to enable us to carry out our objective of preserving the peace. You are familiar with the published estimates of Soviet air strength.

These estimates leave no doubt as to the real strength of the potential enemy and the dangerous margin that he has opened up within the last few years between the weight of his air power and ours as it now exists and as it is now planned. Therefore, it is my opinion that the 95-group Air Force, towards which we are building with great energy at the present time, can be looked upon only as an interim objective or goal, for it will lack the capacity to do all that is expected of it. Therefore, it must not be accepted by the American people as sufficient for our national security as we measure the world today." John A. McCone, Under Secretary of the Air Force.

TURBOPROP CARGO PLANE

Lockheed has won a five-company competition for development of a new turboprop medium cargo transport for the Air Force. Its paper designation is L-206. It will be distinguished by a squat fuselage with large aft cargo doors suitable for straight-in freight handling. First model is expected to carry four Allison T-38 turboprop engines.

UNLIMITED JET TRAINING

The RAF has set no limit to the number of pilots it will train for jets and is ordering large-scale production of jet fighter-trainers. A new fighter-trainer with side-by-side seating for instructor and pupil has been ordered, in addition to tandem trainers. Jet trainers in production are the Meteor 7 and the Vampire. The program also contemplates training for the Canberra and for the four-jet Valiant bombers.

BRAIN AND BRAWN

The powerful J-57 jet engine will be equipped with a device for controlling the flow of fuel and governing the speed of the turbine wheel. It combines an electronic "brain" with hydro-mechanical "brawn." The gadget relieves the pilot of a number of specialized duties in the operation of the turbine engine. In addition to controlling turbine wheel speed, the unit senses engine speed, temperature of the air entering the engine, and the tailpipe temperatures. Any tendency of the engine to exceed design limits of speed and operating temperature is promptly controlled by the unit, which signals the hydraulic device to reduce the flow of fuel to the combustion chambers.

JETS FOR THE B-47

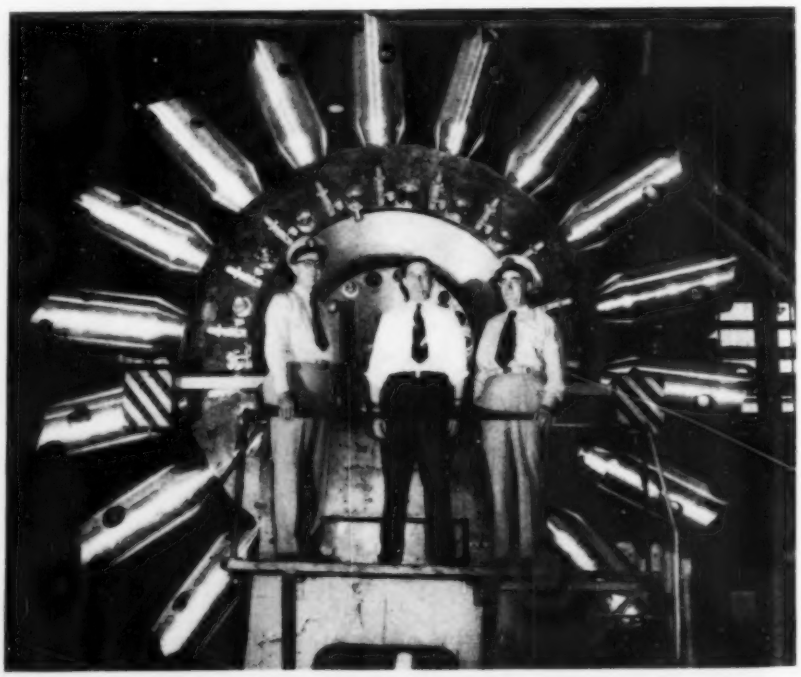
Packard's entire production of J-47 dash 23 jet engines, built under a licensing agreement with GE, has been earmarked for the Boeing Stratojet. The Packard plant will adjoin the company's proving grounds north of Utica, Mich. The dash 23 is now rated at more than 5,800 lbs. of thrust, 600 lbs. above the previously announced power rating for that engine. The Stratojet carries six jets. In addition to a higher thrust rating, the dash 23 has a lower rate of fuel consumption, is completely anti-iced, has special ignition for high-altitude starts, and may be equipped with water injection.

THE WINNER—BEECH!

Beech Aircraft Corporation, largest manufacturer of light transport and twin-engine trainer aircraft during World War II, is heading toward a peacetime record in dollar sales volume and units of production. Its accelerated production program was given a shot in the arm a few weeks ago with announcement that the T-36 had been designated the winner of an Air Force design competition for development of a new type twin-engine trainer. The T-36, still classified, will be turned out in Wichita. Size of the contract is indicated by Beech's announcement that production is scheduled to continue through 1953.

MASS PRODUCTION MISSILES

Construction of the world's first integrated mass production plant for guided missiles is under way at Pomona, Calif., under supervision of Consolidated Vultee Aircraft Corporation. It is a 40 million dollar Navy facility designed for assembly line production of supersonic interceptor-type missiles. When the 140-acre installation is completed in 1952, Convair will move its Guided Missile division from San Diego.



Hub of a giant controllable-pitch wind tunnel propeller built by the Navy for high speed jet engine tests in NACA's flight propulsion laboratory.

PLANE FAX

Quick picture of

McNARY FIELD, SALEM, OREGON

Flying School . . . 5500′ paved runways . . . Hangar facilities . . . Tower U. S. Naval Reserve Air facilities . . . Complete Standard Oil Service . . . Noted for heavy schedule of aerial crop dusting and spraying operations.

Fall Flying

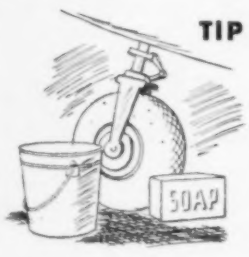
IS THE YEAR'S BEST

Autumn days are banner flying days in the West. Wherever you go, you'll find more brilliant foliage, deeper blue autumn skies, smoother flying. And lower, off-season rates at many resorts! For a week-end or a full vacation—enjoy fall flying.

L. J. "Ace" Demers, of Ace Flying Service, says: "In the Pacific Northwest, visitors look for our finest flying weather in the fall. Fewer thermal currents mean fewer bumps in small-plane flying; settled weather lets you get there—and back—on schedule."

"With a fleet of nearly 100 field-based planes, a summer-long crop-dusting program, and many visitors, we're busy at Ace. That's why we carry top aviation products. And that means Chevron 80/87 Aviation Gasoline and RPM Aviation Oil. They give us top performance and minimum engine wear—even in grueling crop-dusting operations—and we're not surprised that 80% of visiting pilots ask for them by name."

T.M.'S "RPM," "CHEVRON," REG. U.S. PAT. OFF.



TIP OF THE MONTH

Oil, grease, and tar deposits from leakage and runways deteriorate airplane tires. In these days of shortages, regular cleaning with soap and water will prolong the life of the tires on your plane.

CHEVRON AVIATION GASOLINE

RPM AVIATION OIL

STANDARD OIL COMPANY OF CALIFORNIA

NOTES ON CIVIL FLYING

New CAA Written Tests

The CAA's new written examinations for all applicants for private pilot ratings began Aug. 1, after an exhaustive survey among flight operators, instructors and examiners and a careful analysis of accidents involving private pilots. The grass roots study resulted in publication of a booklet containing 200 questions and answers on which the written exams are based (see page 21).

Briefly, amended Civil Air Regulations require a written test on the regulations, elementary navigation by pilotage, weather recognition, and safe operating procedures. Cross-country flight instruction and solo practice area increased under the new regulations, which also call for a flight test more directly pointed to the flying the applicant will do as a private pilot.

Other requirements: Fifteen hours of dual instruction and 25 hours of solo practice; five hours of dual instruction on cross-country, including three hours of dual before first solo cross-country; 10 hours of solo in cross-country flight; including one flight with a landing at least 100 miles from point of departure; all flights logged as cross-country must include a landing at least 25 miles from point of departure.

Flight test will include prevention of and recovery from stalls entered from all normally anticipated flight attitudes; turns around a point or area on the ground; accurate approaches and landings using power and flaps; a demonstration of cross-country flight planning and flying; cross-wind takeoffs and landings; and short or soft field takeoffs.

Jet Helicopter Record

Bruce Jones is shown here in a Hiller-Hornet which he flew to an unofficial world altitude mark (7,500 feet) for jet

helicopters. The flight was the first in a series of altitude tests conducted by Hill Helicopters of Palo Alto. The Hornet recently demonstrated its ability to make safe landings from altitude minus power.

Drained vs. Full Tanks

Recent tests by the National Safety Council showed that during the summer an airplane fuel tank contains an explosive atmosphere for as long as seven hours after it has been drained. By the end of the seventh hour, the gasoline vapor concentration passes the upper limit of explosive range and the tank is relatively safe. Similar tests during winter indicated that an explosive mixture remains in some portion of the tank indefinitively after draining. The Council's conclusion: For aircraft in for ordinary maintenance, it appears that it is best to leave tanks alone unless they are to be worked on. Draining may only create an extra hazard, unless tanks are inerted too.

The Airlines in a Crisis

In case of a national emergency, the scheduled airlines today could furnish over 12 times as many seat-miles per month as they had available in any one month before Pearl Harbor.

Says Brig. Gen. Milton W. Arnold of the Air Transport Association:

- Today the scheduled airline fleet totals 1,114 aircraft of which 520 are four-engined. In 1941, the fleet totalled 342 planes.
- Today the total lift capacity in terms of daily aircraft seat miles is 80,635,294 In 1941, it was 6,412,280.

Use That Radio

CAA reports that getting pilots to use their radios when they need help continues to be a problem. Officials of CAA believe one reason some pilots are mute when they should be using radio is that they don't know the slicked up, abbreviated language of communicators. They have the notion that if they don't use such language they will be called down. However, CAA points out that this special lingo is used for speed and clarity. It is not compulsory. Any words that will get the message across are satisfactory.

Super Constellations

New super Constellations now in quantity production have the longest passenger cabins in the longest fuselage of any commercial transport aircraft. Key change in the triple-tailed plane is extension of the fuselage by 18 feet five inches, making over-all length 113 feet 7 inches. Lockheed claims the super Connies will carry more payload farther, faster and more economically than any other transport.

Stall Recovery

The CAA reports that preliminary returns show a reduction in stall-spin accidents in regions where the stall recovery program has been conducted, and an increase where there is no such program.

404's Initial Flight

First of the nation's newest commercial airplanes, the Martin 404 airliner, made its initial flight Aug. 1. Eastern and Trans World Airlines have ordered a total of 101 Martins, which are designed and structurally stressed for the use of turboprop engines. Current engines are two R-2800s, each developing 2,400 h.p.

Unique Control Tower

This new control tower at Sky Harbor airport near Phoenix looks like, well, like no other control tower we've ever seen. It is to be the central building in the new

construction program at Sky Harbor. The administration building and the air line offices will surround the tower. For figger filberts, the tower is 100 feet high and has a spiral stairway with exactly (ask the operators) 139 steps. Diameter of the tube is nine feet.

He Flew Faster Than Sound

By TOM POWERS

WHAT are the sensations and reactions of a pilot as his rocket-powered plane thunders along the skyway at a speed of approximately 1,300 m.p.h. more than 13 miles above the earth?

We asked Bill Bridgeman, Douglas Aircraft test pilot, that question soon after he drove the Navy's *Skyrocket* to that speed and altitude on June 11, and here is his surprising answer:

"Well, so far as speed is concerned, you can get a better sense of acceleration by getting on a motorcycle and kicking it around at 60 m.p.h. than you can in a supersonic plane like the *Skyrocket*.

"To be truthful about it, I got a greater thrill when I soloed in that old Stearman as a Navy cadet at Long Beach 10 years ago. But don't get me wrong about that June 11 supersonic flight. The 'Flying Swordfish' (the

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Briefly, amended Civil Air Regulations require a written test on the regulations, elementary navigation by pilotage, weather recognition, and safe operating procedures. Cross-country flight instruction and solo practice area increased under the new regulations, which also call for a flight test more directly pointed to the flying the applicant will do as a private pilot.

Other requirements: Fifteen hours of dual instruction and 25 hours of solo practice; five hours of dual instruction on cross-country, including three hours of dual before first solo cross-country; 10 hours of solo in cross-country flight; including one flight with a landing at least 100 miles from point of departure; all flights logged as cross-country must include a landing at least 25 miles from point of departure.

Flight test will include prevention of and recovery from stalls entered from all normally anticipated flight attitudes; turns around a point or area on the ground; accurate approaches and landings using power and flaps; a demonstration of cross-country flight planning and flying; cross-wind takeoffs and landings; and short or soft field takeoffs.

Jet Helicopter Record

Bruce Jones is shown here in a Hiller-Hornet which he flew to an unofficial world altitude mark (7,500 feet) for jet

helicopters. The flight was the first in a series of altitude tests conducted by Hill Helicopters of Palo Alto. The Hornet recently demonstrated its ability to make safe landings from altitude minus power.

Drained vs. Full Tanks

Recent tests by the National Safety Council showed that during the summer an airplane fuel tank contains an explosive atmosphere for as long as seven

dents in regions where the stall recovery program has been conducted, and an increase where there is no such program.

404's Initial Flight

First of the nation's newest commercial airplanes, the Martin 404 airliner, made its initial flight Aug. 1. Eastern and

construction program at Sky Harbor. The administration building and the air line offices will surround the tower. For figger filberts, the tower is 100 feet high and has a spiral stairway with exactly (ask the operators) 139 steps. Diameter of the tube is nine feet.

AGES

SSING

He Flew Faster Than Sound

M POWERS

ons and reactions of a pilot as his ne thunders along the skyway at nately 1,300 m.p.h. more than 13

man, Douglas Aircraft test pilot, r he drove the Navy's *Skyrocket* le on June 11, and here is his sur-

is concerned, you can get a better by getting on a motorcycle and) m.p.h. than you can in a super-sonic plane like the *Skyrocket*.

"To be truthful about it, I got a greater thrill when I soloed in that old Stearman as a Navy cadet at Long Beach 10 years ago. But don't get me wrong about that June 11 supersonic flight. The 'Flying Swordfish' (the

This is the way the Douglas Skyrocket, flown by Bridgeman to new speed and altitude marks, was launched from its Boeing B-29 mother plane. Note section of B-29 fuselage cut away to provide space for the Skyrocket's tail section.

Skyrocket's nickname) most certainly provided me with a thrill, but I still don't think it can compare with my solo flight."

Here is Bridgeman's account of the historic flight, which earned him the title of "world's fastest human being," as recorded during an interview for FLYING:

"To begin with, I had the feeling from the start that this might be the day we'd get out in front. By that I mean break the altitude and speed record by a wide margin. George Maybrey, the Douglas aerodynamist, had me push the 'Rocket along slowly for several months—increment by increment—and I just felt we were reaching for a climax performance.

"After getting into my flight suit—some call it a space suit—and putting on my fur-lined boots, I was driven to the flight line in a jeep. At 10 a. m. we took off with an all-civilian Douglas-employed crew handling the B-29 mother plane.

"I relaxed in the navigator's compartment until we reached 20,000 feet. Then the crew members helped me slip into the 'Rocket and I went through the usual procedure of strapping myself in, fitting my flight helmet, checking the instruments and radio, and other such standard cockpit practices for supersonic planes.

"The suit I wore, details of which are still top secret with the Air Force, is much like a diver's suit and it doesn't allow for much movability. This is why the B-29 crew must help me get into the Skyrocket. The boys handed my lines back to the cockpit and then I broke loose and they took in one line and I plugged into the line that's tapped into the Skyrocket. This is for my oxygen supply.

"Then the canopy of the test plane was secured. There is about a 40-minute wait until the B-29 gets to about 35,000 feet. Meanwhile, I kept busy preparing the four rocket barrels by pressuring the fuel system. The rockets are not ignited at this stage. Also an F-86 Sabre jet hovered nearby as an observer aircraft.

"About five minutes before the B-29 reached the 35,000-foot altitude, I was warned by Pilot George Jansen that we were on a certain heading, that the indicated air speed was 240 miles an hour, and 'get ready, Bridgeman.'

"Then he started counting off the minutes—4-3-2-1—and zingo, he cut me loose from the B-29 by tripping an electrical switch much in the way a bomb is released.

"At this point I'm on my own for sure!

"The big trick is getting those four rocket barrels firing as fast as you can because of the altitude lost in the drop.

"The boys in the B-29 don't want you to fire the rockets too soon, of course, as they fear a fire. As it is, they call the Skyrocket a 'flying acetylene torch.'

"In about six fast seconds I had the four rockets firing. The acceleration wasn't too abrupt, but you knew you were moving away from the B-29 at a good clip although you were too busy with the instrument panel to pay much attention.

"I immediately went into a sharp 45-degree climb. This always baffles me. You can put the nose of the 'Rocket right into that angle of climb and it just keeps going up and up. Most airplanes stall out after being put into such a steep climbing attitude, but not this one.

"When I reached the altitude designated for the test run, I pushed over and went into level flight as directed. Right about here is where I had the bull by the horns. I just sat tight and waited until the propellant—liquid oxygen and alcohol—ran out.

"I immediately called over the radio to the B-29 that 'I'm out of gas and coming home.' Then a 'Roger' reply came back both from the B-29 and from Maj. Charles Yeager and Lt. Col. Pete Everest, both of whom are Air Force test pilots at Edwards. (Yeager was the first pilot to breach the sonic barrier. He did it in the Bell X-1 in 1947. Everest took the X-1 to its top altitude).

"Yeager and Everest were my escort observers, waiting

at the far end of the course to guide me in after my propellant was exhausted.

"The period in level flight lasted a little over two minutes. The rocket engines consume about a ton of propellant a minute. I must say that when I pushed over and went into a level attitude there was a feeling of lightness. I still knew full well that I was functioning normally. It was quite comfortable inside the plane despite the 10-degree below zero outside temperature.

"After the accelerated run, I made a 180-degree turn, came back, lined up the dry lake bed, put the 'Rocket on the downwind leg at 15,000 feet, made a couple of S turns, and went into a glide at 275 m.p.h. I came in over the edge of the field at 250, and touched down at about 180-190 m.p.h., dead stick.

"On the way down, Yeager and Everest came along side and gave me the word about my landing gear being down and other pertinent information. Both pilots have been of great help throughout the program.

"The return run is always a nice trip as this plane has a beautiful glide ratio and you can glide ten times further than you drop.

"The entire flight—from the launching to the touch down—took about 13 minutes. Fifteen per cent of this time was in actual level flight. It was an instrument flight all the way. And I'm always glad to touch the good earth again. I'll admit that openly. Once in a while on these supersonic flights I've gotten a red warning light on the instrument panel, which means that some of the parts are getting hot and a fire could break out, but this didn't happen on that June 11 run. Everything went as planned."

To the Air Force personnel and civilians at Edwards Air Force Base, supersonic flights are now "old hat."

But to the Douglas Aerodynamist Maybrey the June 11 flight of Test Pilot Bridgeman didn't come under that classification—especially after he had an opportunity to view the photographic notations taken by an automatic camera inside the cockpit while the Skyrocket was in the test run.

When Maybrey completed his calculations and observations he sent for Bridgeman. This was some two hours after the flight had been completed.

Bridgeman looked over Maybrey's shoulder as the aerodynamist "fished" the film through the "soup."

In the most casual manner, the two started discussing plans for the next flight of the *Skyrocket*.

There was some talk of the chamber pressure in the *Skyrocket's* cabin during the flight. Were there any leaks? Was it sealed air tight? What would have happened if twice as much propellant could have been accommodated?

"Maybrey didn't have to tell me I had gone higher and faster than anyone else," Bridgeman said. "I knew all of this because the rocket engines didn't fail me at the critical point. This plane has been reduced in design and manufacture to the nth degree. On the June 11 test everything clicked to perfection."

There was no champagne; no slaps on the back; no big celebrations planned on the spot. Work at the base went on as usual for as Bridgeman explained:

"It was just another job of flying an airplane. It wasn't routine, but it was a job that had to be done."

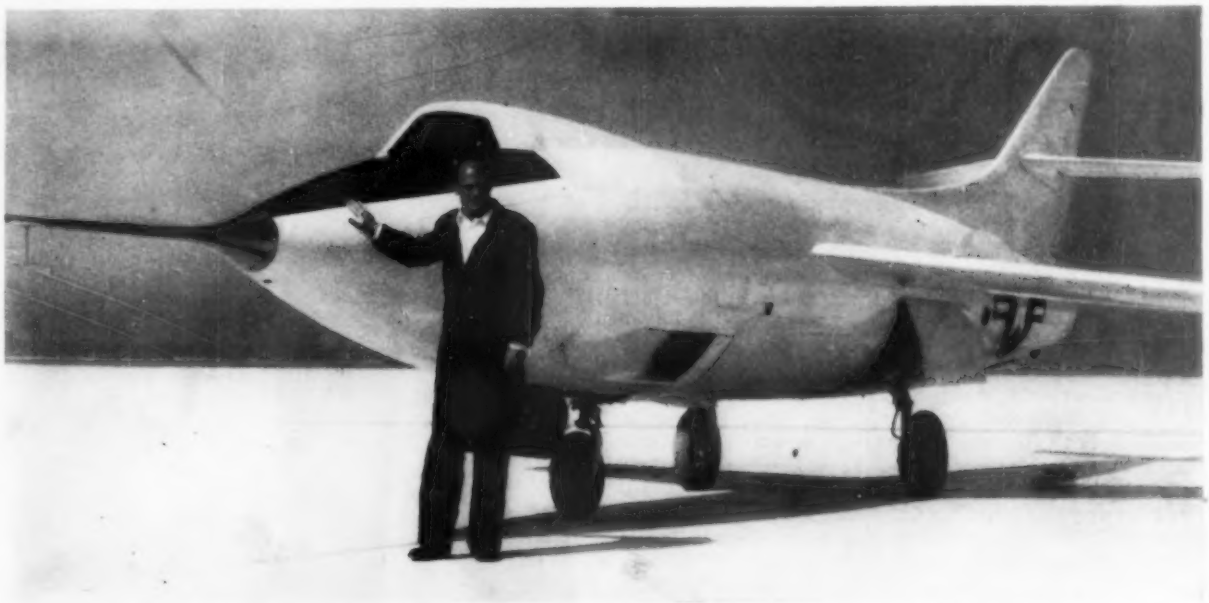
Bridgeman gives full credit for the success of the flight to the Douglas scientists and engineers who designed and built the Skyrocket six years ago in the firm's El Segundo plant in the southwest section of Los Angeles.

The chief design engineer was Edward Heinemann of the El Segundo plant. He is a tall, bespectacled man of middle age who willingly steps aside in the true manner of the scientist while others take the podium and relate the accomplishments he has brought about.

"Ed Heinemann is an expert in the field of calculated risks," Bridgemann said. "He can do more with a slip stick and a set of charts than any man I've ever known. With the expert technicians we have at Douglas, and with Heinemann setting the pace, well—it just gives a guy confidence when he's knocking at St. Peter's door."

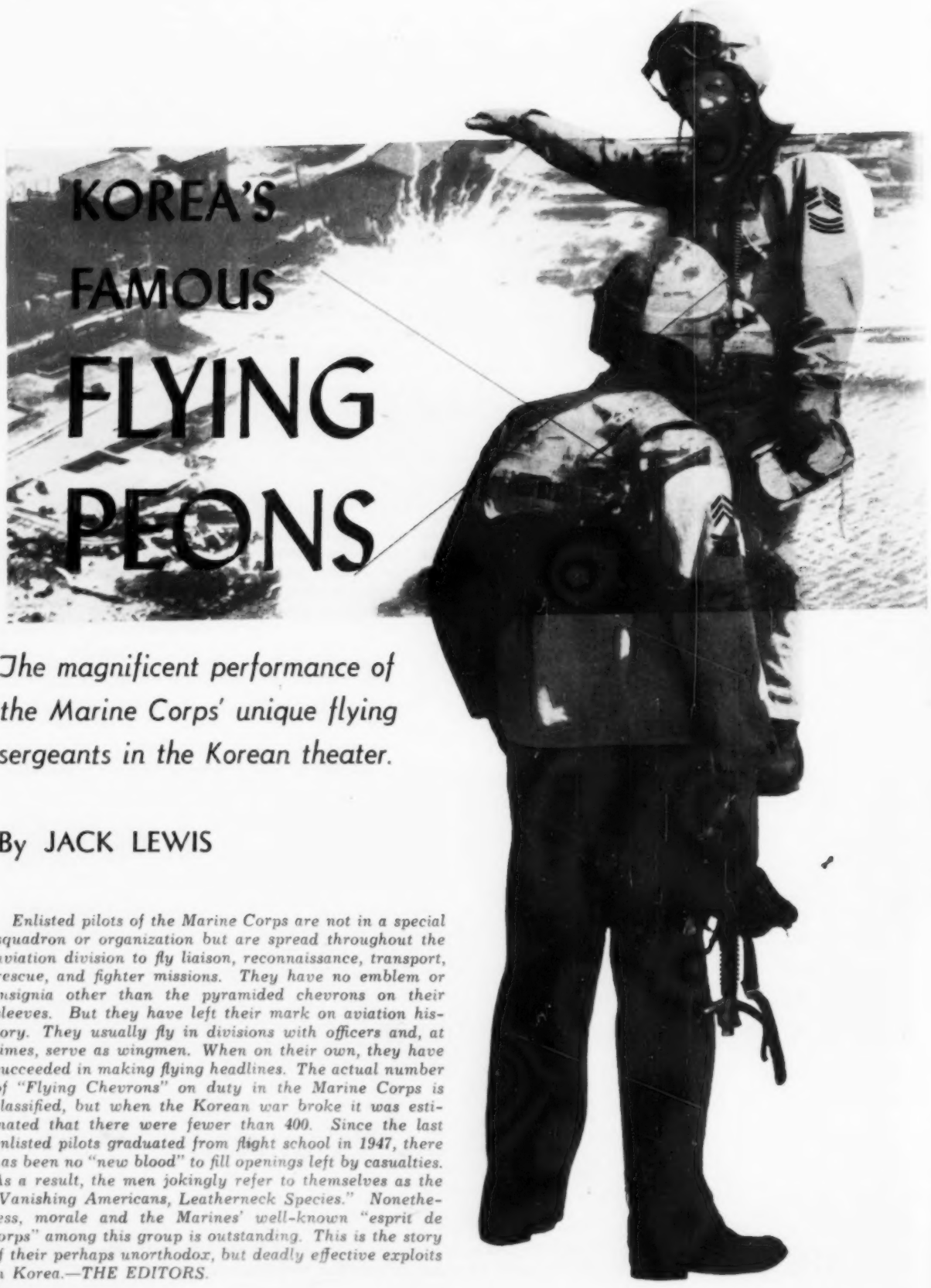
The Skyrocket, a complicated "flying laboratory" consisting of an orderly mass of instruments and gadgets, is 40 feet long and weighs about 15,000 pounds. It has a wing spread of 25 feet.

The craft's wings are sweptback to reduce the drag, although the use of flaps in (*Continued on page* 46)



The world's fastest human, Douglas Test Pilot Bill Bridgeman, at Edwards Air Force base, Muroc, Calif., shortly after he flew the Skyrocket far beyond the speed of sound. He has made more than 60 flights in the research airplane.

KOREA'S FAMOUS FLYING PEONS



The magnificent performance of the Marine Corps' unique flying sergeants in the Korean theater.

By JACK LEWIS

Enlisted pilots of the Marine Corps are not in a special squadron or organization but are spread throughout the aviation division to fly liaison, reconnaissance, transport, rescue, and fighter missions. They have no emblem or insignia other than the pyramided chevrons on their sleeves. But they have left their mark on aviation history. They usually fly in divisions with officers and, at times, serve as wingmen. When on their own, they have succeeded in making flying headlines. The actual number of "Flying Chevrons" on duty in the Marine Corps is classified, but when the Korean war broke it was estimated that there were fewer than 400. Since the last enlisted pilots graduated from flight school in 1947, there has been no "new blood" to fill openings left by casualties. As a result, the men jokingly refer to themselves as the "Vanishing Americans, Leatherneck Species." Nonetheless, morale and the Marines' well-known "esprit de corps" among this group is outstanding. This is the story of their perhaps unorthodox, but deadly effective exploits in Korea.—THE EDITORS.

THE OPERATIONS building on the tiny air strip at Wonsan, North Korea, was quiet as the officer stood in the center of the floor looking soberly about the small group of First Marine Air Wing pilots. Word had come that a plane was needed to evacuate a wounded Leatherneck from an isolated forward area a few miles away.

The helicopters and Stinson *Sentinels*, which the Marines had been using for air evacuations, were not equipped with radio, instruments or radar. As a result, night rescue flights had been considered near impossibilities. For this reason, the commanding officer had refused to assign a man to the rescue mission but had instead called for a volunteer.

T/Sgt. Wayne Kerr of Cleveland, O., stepped forward for the assignment and moments later went out into the night on the most dangerous aerial mission of his life. Using a flashlight to see his map and compass, he flew a *Sentinel* into the mountainous area where the surrounded Marine group unit was located. He had to weave his way through a narrow canyon in complete darkness.

"All I could see," Kerr related afterwards, "were the mountain peaks outlined against the stars. I had to guess from that where the walls of the pass must be."

Over the area, the technical sergeant found a 700-foot dirt runway, illuminated at each end by truck lights. At each end of the strip was a mountain. That same day, two lightplanes had been lost while trying to evacuate wounded because they had been unable to get off the short dirt strip.

Kerr, however, succeeded in landing on the runway and flying the wounded Marine back to Wonsan, from where he was transferred to the hospital ship in the harbor.

M/Sgt. Billy R. Greene of Santa Ana, Calif., was on a strike on the North Korean capital of Pyongyang, when Second Lieut. Dean C. Macho of Dan Diego was shot down. Greene climbed for altitude until he could radio for a Bell rescue helicopter. He then "went downstairs on the double." He and two other pilots, who had been in the area, flew cover for the downed flyer until the rescue team arrived.

Three Marine "Flying Chevrons" check a map before a flight at El Toro Marine Corps Air Station, Calif. The enlisted pilot is fast becoming extinct. Training stopped in 1947.

The Reds had seen the pilot fall and were beating the bushes for him. Whenever the Red soldiers came close to him, Greene and the others made rocket, napalm and strafing runs to discourage the searchers. They kept this up for over an hour, until the helicopter picked up the downed pilot.

Hundreds of feats such as these have been piled up by the Marine Corps' enlisted pilots. Composed of technical and master sergeants, there are fewer than 250 of these men in the entire Corps. Working with officer-pilots, they found themselves in the "neither-fish-nor-fowl" category. But they have gone on to turn in one of the highest performance records during the Far Eastern hostilities.

A quartet of enlisted night-fighter pilots were part of the early Marine ground and air units in the Korean conflict. They wrought such havoc against the enemy that they were dubbed the "Acme Wrecking Company" by civilian correspondents.

The four pilots were led by M/Sgt. James A. Mayhew, a veteran of a dozen years service, most of it spent in an airplane.

Starting at the Pusan perimeter, these men flew missions clear to the Manchurian border. They called themselves the "Flying Peons," and the title spread throughout Korea and Japan. Eventually, it was adopted by enlisted pilots in the entire war zone.

Mayhew's group on one occasion was called upon to furnish close air support—the Leatherneck air specialty —to Marine ground forces pinned down by Red guerrillas near the city of Kojo. During the night, the quartet succeeded in knocking out enemy emplacements that had been set up less than 50 yards in front of the Marines. They made strafing and rocket runs only 25 yards ahead of friendly lines to break up the infiltration attempt which threatened the unit.

Another pilot assigned to the ground Marines to coordinate air-ground work credited the pilots with "pulling us out of the fire" during a long, black night. The task seems impossible when one remembers the rule-of-thumb that 100 yards should be allowed as a safety factor for each 100 pounds of explosive being dropped. For a 200 lb. bomb, a safety zone of 200 yards is best.

Through most of the winter, as United Nations troops pushed northward and then withdrew, the soft-spoken, "Pappy Mayhew callin! What'cha all need?" coming in over the forward air controller's radio became a familiar phrase. Always it meant that the "wrecking company," composed of Mayhew of Costa Mesa, Calif., T/Sgt. Paul Sallade of Pittsburgh, Pa., T/Sgt. Larry Keegan of Dubuque, Iowa, and T/Sgt. Guss Pennel of Nenoir, N. C., was on the job.

This package of organized mayhem finally was broken up by a higher command which feared that the enlisted pilots, flying missions along the Yalu River, might spot the wrong target and bring (*Continued on page* 48)

From top left clockwise: Ex-barnstormer Sgt. Don Taft, first Peon to fly the DC-4; Sgt. Herb Valentine whose Korean feats have made him a legend. Sgt. John Sodd, evacuation transport pilot, and Navy Cross winner Sgt. Bob Arthur who flies a transport.

Neither rain nor hurricanes can stay these pilots from completion of their appointed missions.

INTERCEPTION AROUND TH

The Briefing officer (top) pinpoints the mission for the day before the pilots (right) slog out through the rain or fog or wind at the Tyndall AF base.

"NOT for sissies!" is the Air Force's terse comment on the advanced training course at Tyndall Air Base, Panama City, Fla. That's where the two-man interception teams—the eyes of the Air Force—are trained.

At Tyndall pilots who are already experienced, and radar-observers who have already proved their worth, are prepared for "interception under varied conditions." By that they mean conditions varying from vile to sheer hell.

The course includes flying in all kinds of weather, whether the Gulf of Mexico is mixing up a hurricane or the powder-fine sands of Panama Beach are drifting across the runway to make a greater skid hazard than glare ice.

Sometimes a pilot, who thought he was good until he started as a "freshman" at Tyndall, and his seeing-eye—the radar observer—are seen sloshing through rivers of rain to where the airstrip ought to be. The storm has cancelled all commercial flights in the area. The Coast Guard is flying ominous storm warnings. But these two sodden men are on the way to a routine mission. The eyes of the Air Force cannot be blinded by a little rain.

Training for "Interception Around the Clock" is tough. And it's fast. The interceptor teams get the newest and fastest jets. Teams are now training in Lockheed F-94s. As soon as the Northrop *Scorpions* (F-89) are off the production line, they'll be flying those souped-up gas pipes.

Pilots and observers at Tyndall are blasted out of bed at any hour to get their jets into the air in incredible speed to "find, intercept and bring down enemy planes during the day or night, rain or shine, CAVU or SNAFU."

This whole conception of interception has grown since Northrop's F-61 *Black Widow* made history during World War II. The *Widow* was the outstanding high-speed, twin-engine night fighter inat least two theaters of operation, and its record on night prowls blazed the way for hunting out enemy targets "blind" with intricate radar equipment.

The F-61 required a crew of three: pilot, radar-observer, and gunner. Now two men have to do a better job and do it faster in a jet.

After the close of the war, many experiments were sponsored by the Air Force, using the F-61 as an all-

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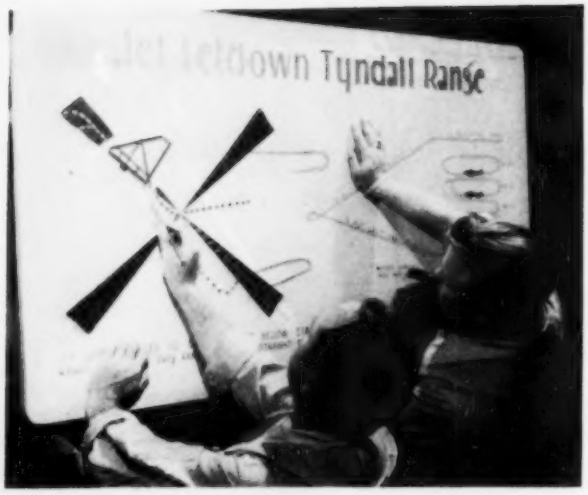


Pilots taking the rugged training course at Tyndall must become familiar with the field's let-down range.

Under the hood training under control of a GCA operator is an important part of pilot's education.

weather plane. Equipped with its war-time radar and other electronic devices, it was sent scouting for bad weather, bringing back reports of flight characteristics through all types of storms.

However, the F-61 has given way to the F-94 and the F-89, which themselves have advanced from the night fighter class to an all-weather fighter through the earlier experiments of the "Widow."

Today, at Tyndall Air Force Base, pilots and radar-observers, most of them veterans of World War II and a few from the Korean conflict, are learning the operation of the F-94 through varied weather conditions. Behind the pilot in this two-place jet rides the radar-observer, maintaining a close observation of the radar screen and directing the target intercept. These two men make up this modern fighter team.

All training at Tyndall is not devoted to the Lockheed built F-94 alone. The pilot spends many hours flying the North American T-28 (conventional engine trainer) and the Lockheed T-33 (two-place jet trainer) where he is "under the hood"—using only his instruments with the canopy blacked-out. In the forward cockpit the instructor observes his operations. While flying "in the dark," he makes several landings under the direction of GCA (Ground Control Approach), further enabling him to handle the plane under all types of weather.

These ground-bound jet trainers reproduce actual flying conditions. Inside the trainer he can hear the burble of the jets and the ominous sounds if he doesn't throttle it right. He sees lightning flashes and hears all the fury of a storm. But he doesn't know the "joy" of getting soaked in the sudden Florida downpours until he is on 24-hour duty as part of his training.

While the pilot becomes more proficient in instrument flying, his radar-observer is undergoing a course at Keesler Air Force Base, Biloxi, Miss., in radar operations and techniques. At the end of the four-week refresher course or complete 15-week course, the team unites for further schooling. The radar-observer acts to the pilot as a seeing-eye dog to the blind. The assorted "blips" on the radar screen must be carefully scrutinized by the radar-observer to distinguish friend from foe. While on prowls through the worst kind of weather his findings prevent any possible mid-air collisions with "enemy" aircraft.

After a preliminary resume of training for the following four weeks, the team with instructors spends several hours flying the B-25, radar-observer flying classroom. Various problems are presented (*Continued on page 57*)

Planes used by the interceptors at Tyndall include the F-94, B-25, T-33 and T-38, shown on a runway at the Panama City, Fla., base. At right, student pilots putting in time in the B-25 radar-observer flying classroom.

Miltonberger

It's RUGGED but RIGHT

CAA's new written test for private pilots is tough but it's necessary to rebuild air safety.

The postwar private flying boom was a short-lived one. In order to restimulate the interest of prospective lightplane pilots, both the airfield operators and the CAA agreed to relax the rigidity of Civil Air Regulations, eliminate the written certification tests and to lower the minimum hour requirements on air instruction.

Negative results were obtained, since the volume of accidents increased and tended to discourage rather than encourage new students. Some months ago a special committee was appointed by CAA to evaluate the problem and made recommendations for its solution (FLYING June, 1951). The committee attributed the majority of accidents to *pilot error*, which CAA defines as *carelessness, poor technique* or *lack of knowledge*.

Lack of knowledge has caused the reinstatement of a stiff written examination. The CAA has prepared a booklet containing 200 questions and answers covering CAR, Weather Recognition, Pilotage and General Operation. Applicants will be given a set of 50 true or false statements culled from the prepared group.

FLYING has selected 50 representative statements so that you can pre-test yourself. If your score is less than perfect, send for the Manuals (Civil Notes, page 10), which can be obtained from the Government Printing Office. Study them carefully and do your part in making the airways safer for the private pilots. Answers on page 56.

CIVIL AIR REGULATIONS

1. An alternating red and green control light, either on the ground or in the air, means you should exercise caution.

2. You are approaching an airport where there is a control tower in operation. You are not equipped with radio. You observe the wind tee indicating a landing on runway 23. However, you also observe other aircraft landing on runway 34. You should plan (*Continued on page* 55)

The Soviet's newest and best liaison plane is the Yak-14. Here's how it stacks up with comparable American and British aircraft.

How good is RUSSIA'S BEST LIGHTPLANE?

By CHARLES W. CAIN

LONDON.—The four-seat Yak-14, built along distinctly American lightplane lines, has blossomed out as Russia's No. 1 general duties liaison aircraft.

No other plane in that class is known to the author, who believes that the delay in putting the Yak-14 into mass production has been due to frantic efforts of top Russian designers to turn out first-line jet fighters in the immediate post-war years.

Now, with the panic over, the other types of military airplanes needed by the Russians are being turned out in quantity. For Col. Gen. Aleksandir Sergeivich Yakovlev, its designer, the Yak-14 completes a cycle. He began his engineering career in the middle 1920s with gliders and light, slow flying sports planes and trainers.

By 1951 standards in America, the Yak-14 is unspectacular, although it looks robust enough and has the advantage of a large wing area and generous tail surfaces. The full span leading-edge wing slats, the chunky undercarriage legs and increased windowing, plus the massive radio mast, are ample clues to the purpose of the plane. The hinged panel for stretcher, to the rear of the cabin, is reminiscent of the Stinson L-5.

How good is the Yak-14? Let's examine it closely, in the light of the most recent data available.

MAINPLANE—The overall span is 39 feet 6 inches, with streamlined vee bracing at the bottom of the fuselage. An auxiliary inverted vee brace runs from the front main spar to the main vee. The structure is of mixed wood and metal with fabric covering. The untapered wing to rounded tips has an area of 237 square feet. Main difference between the wings on the two models shown here is the full-span Handley-Page Lachmann type slats incorporated in the current model to help reduce speed. Metal split flaps are fitted to the trailing edge.

FUSELAGE—Like the wing, the fuselage is of mixed wood and metal construction with fabric covering. The nose cowling remains about the same on both models but from the cabin back the line changes. The 1951 model has rear windows, plus top center section transparency. A large vertical radio mast has also been incorporated. Aft of the mainplane the 1951 model has a slimmer fuselage giving better rear vision.

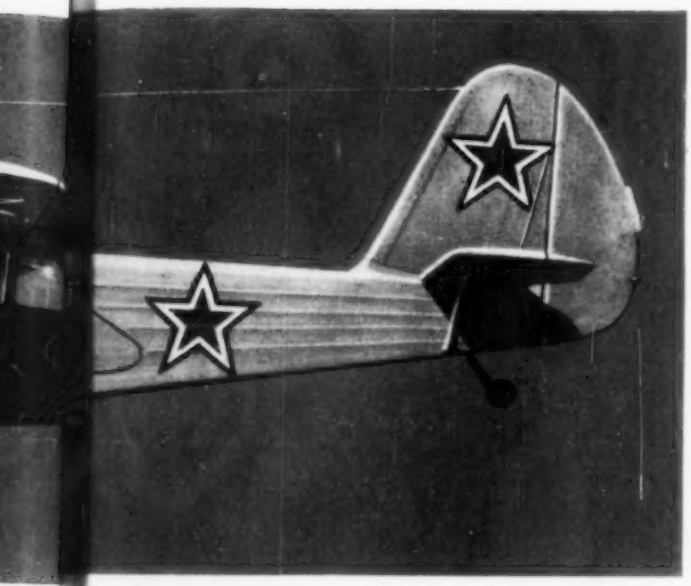
TAIL ASSEMBLY—All surfaces are externally braced and are fabric covered. On the 1951 model the fin area appears to have been increased to counteract the loss of side area resulting from the slimmer rear fuselage. The rudder has a large fixed trim tab.

UNDERCARRIAGE—Normal fixed main legs with oleo shock absorber struts and two half axles are hinged to the center line of the fuselage. In the 1945 model trim spats covered the main wheels but they have since been discarded because of fouling in rough terrain landings and takeoffs. The fixed tailwheel is carried on a sprung fork.

ENGINE—The ever popular five-cylinder M-11 (designed by Aleksandir Dmitrevich Shvetsov) is still widely used in the Soviet Union and ranges in power from 100 h.p. to 160 h.p. The 1945 model is listed as having a 145 h.p. M-11FM, although the 1951 model may be powered by the 160 h.p. M-11RF radial. It drives a metal two-blade, variable-pitch VISh (a) propeller. The large spinner is missing from this latest model. The helmeted cowling is novel to Western eyes but has been widely used in Russia in the past two decades.

COLORING—Since World War II, the Russians in common with the air forces of the Western World have reverted to all-silver coloring. It is a point of interest that the 1945 model appeared with yellow star insigne but that the 1951 model has the generally accepted red star. One reason for the wartime use of (*Continued on page 41*)

The USAF's Cessna L-19 liaison plane.



Artist's drawing of the 1951 model of the Yak-14.

U. S. LIAISON PLANES HAVE MORE POWER, CLIMB FASTER

	YAK-14*	CESSNA L-19A	DeHAVILLAND BEAVER
Seats	4	2	7
Engine	145 h.p. M-11FM	213-h.p. Cont.	450-h.p. Radial
Span (ft.)	39.5	36	48
Length (ft.)	27.66	25	30.25
Empty weight (lbs.)	1,700	1,400	2,775
Gross weight (lbs.)	2,650	2,100	4,629
Useful load (lbs.)	950	700	1,854
Top speed (m.p.h.)	124	130	179
Cruising speed (m.p.h.)	100	104	153
Climb (sea level)	650	1,485	1,290
Service ceiling (ft.)	13,700	23,100	26,000
Range (miles)	621	800	578

*NOTE: Information and drawing are of 1945 model. Some performance improvement can be expected of 1951 model (probably powered with 160-h.p. M-11RF engine).

De Havilland's famous *Beaver* as the Air Force's L-20.

s Shortest Air Line

The nation's first intra-city air shuttle service is Chicago's answer to the problem of getting to and from a busy city airport

By NORMAN SKLAREWITZ

AS A BIG, in-bound DC-6 taxied to a stop before the modern Terminal Building at Chicago's busy Midway Airport, crewmen rolled up the ramp and the door of the plane swung open. Almost immediately, a young Navy pilot bounced down the steps and hurried past the somewhat startled stewardess.

Inside the concourse, he rushed up to the nearest information booth. "I'm due at the Naval Air Station at Glenview in half an hour," he said breathlessly. "How can I get out there—quick?" The girl behind the desk smiled and, in a matter-of-fact voice, said he could take the air limousine.

A few minutes later the flyer had stowed his grey officer's bag in the baggage compartment and was seated comfortably in a five-place Cessna 195-A. Three more passengers took their seats, the pilot got radio clearance from Midway's tower and the ship took off.

By this time the Navy airman had caught his breath and seemed rather satisfied with himself for making such excellent connections. He leaned forward to tell the pilot so. "Say, nice service you have here," he said. "How long has it been going?"

Over his shoulder the pilot said, "Oh, about twenty minutes." Then, he turned back to the controls. Before the slightly amazed passenger could venture any more questions, he heard the radio checking in being made for the ship's approach to Sky Harbor Airport, Northbrook, Ill. And, with no more ceremony than that, Midway Airlines, Inc.—the nation's first regular air shuttle service—completed its initial run.

Since that day early this summer, the service has become part of commercial air travel in and out of Chicago. What's more, a pattern for the rest of the nation has been successfully established.

Each day throughout the month, the yellow Cessnas, boldly emblazoned with their jumping kangaroo insignia, weave in between the huge, lumbering *Stratocruisers*, *Constellations* and DC-6s and come to a stop before the main Midway Airport terminal gate.

There, in the best airlines' style, a youthful lineman meets the ship, puts down the tiny two-step debarking "ramp" and begins the rapid transfer of baggage to the red cap's truck.

In eight minutes the turn-around is completed. Northbound passengers are aboard and the 27 mile, 12-minute run back to Sky Harbor is off.

Although it has only been five months since the line began, several thousand air travelers already consider the Sky-Harbor-to-Midway hop part of their regular trip. Businessmen, vacationists, servicemen, mothers with small

children—all have been represented on Midway's informal passenger list.

It is, of course, too early in the history of the organization to evaluate it in terms of its overall place in the industry. But, few will deny the already noteworthy contributions made by the founders of the Midway Airlines, Inc.

The company was hardly in business when inquiries began to come in from civic and business leaders in other cities. Some asked about getting the service extended to include their towns. Others wanted assistance in planning similar operations. Some just wished to extend their congratulations for the pioneering job being done.

Anyone who has flown into any major metropolitan airport, either as a commercial passenger, military or civilian pilot, won't require a detailed explanation of why such shuttle services are a virtual necessity.

As commercial aircraft have become bigger and faster, their need for longer runways has grown. Result: airports have moved farther away from the city which they ostensibly serve. Thus, the paradox of mid-twentieth century air transportation devel- (*Continued on page* 60)

Midway's President, Hugh Riddle (left), introduces two new passengers to the airline's Chief of Operation, Warren Baie.

Sporting its high-jumping kangaroo insigne, one of the airline's Cessnas prepares for take-off from Midway airport.

"Red Cap" assists passenger in meeting his outbound flight, as two travelers head for the Cessna for the hop to their nearest airport.

The Texas Bullet

By ED HOADLEY

THE TEXAS BULLET
Model 205

Engine Continental E-185-1	205 h.p.
Wing span	28 ft.
Length	23 ft. 2 in.
Height	6 ft. 6 in.
Empty weight	1,350 lbs.
Gross weight	2,300 lbs.
Wing area	125 sq. ft.
Top speed (5,000 ft.)	192 m.p.h.
Cruising speed (8,000 ft.)	180 m.p.h.
Stalling speed	60 m.p.h.
Rate of climb	1,200 f.p.m.
Take-off run	585 ft.
Landing run	300 ft.
Wing loading	18.4 sq. ft.
Power loading	12.4 h.p.
Range	750 miles
Fuel capacity	48 gal.
Service ceiling	17,800 ft.
Baggage, maximum	125 lbs.
Price (blind group, VHF)	$11,250.00

Type certificate 776. All figures at gross weight. Source: Aircraft Manufacturing Co.

THE TEXAS *Bullet* with its jet assist was widely publicized when it was flown in its experimental stages by "Pop" Johnson of the Johnson Aircraft Company. After the company dissolved, S. J. Taylor and W. E. Stewart, East Texas oilmen, formed the Aircraft Manufacturing Company and took over the design plans to continue production. They rebuilt the plane, removing the jet assist after the flight engineers found that it created drag. Finally, on December 14, 1950, they received their type certificate after months of hard work and testing.

I made three flight checks in the *Bullet* from the company's headquarters at Stewart Airport in Tyler, Texas. With room for two more, General Manager Sam Gibbon and I took off from Stewart, bound for Henderson airport 34 miles away. As we climbed, I took a quick glance at the sensitive altimeter. It was riding on 1,500 f.p.m. We leveled off into a turbulent Texas head-wind and played tag with low ceilings and thunderheads. The time over Stewart was 1:11 p.m. The plane was trimmed out at 1,000 feet. At 1:21, exactly ten minutes later, we had landed at our destination. As Taylor told me later, ". . . the only airplane that can hold a candle to the *Bullet* is the *Bellanca*."

During that flight I checked rudder and elevator pressures which were stiff. The controls also were hard to the touch and I was told by Sam that the CAA had insisted springs be installed. In turns and banks, you have to hold initial pressure. Due to the high speeds, however, it doesn't take but a breath to flick it into a new direction or altitude. I found flight characteristics to be identical to the Globe or Temco *Swift*, or even the old Culver *Cadet* I used to own. There was one distinct difference though. This airplane doesn't hunt for a hard corner or

pitch and toss like a rowboat in stormy seas. It does have directional stability hands off and lots of it. Remember that we were flying in choppy thunder-storm air.

Trim on the elevator is controlled by adjusting the leading edge of the stabilizer vertically, somewhat like in the old J-3 *Cub*. The trim control, located between the two front seats, is, again, tough to move. I surmised that the CAA put springs on this, too. But I can understand why they don't want the leading edge of the stabilizer to get loose. A shaky stabilizer at 180 m.p.h. could be dangerous.

Visibility is fine, except in the ascent. The long nose rises way above the horizon in a published rate of climb of 1,200 feet under gross weight. The top of the cabin fairs into the front plastic and into the curved plastic on each side. The cabin top forms a sunshade, but does not interfere with any turn visibility. At cruise, the nose rides about 18 feet below the horizon. While on the ground, you can see above the nose some 200 feet away. Visibility in the back seats is good, also.

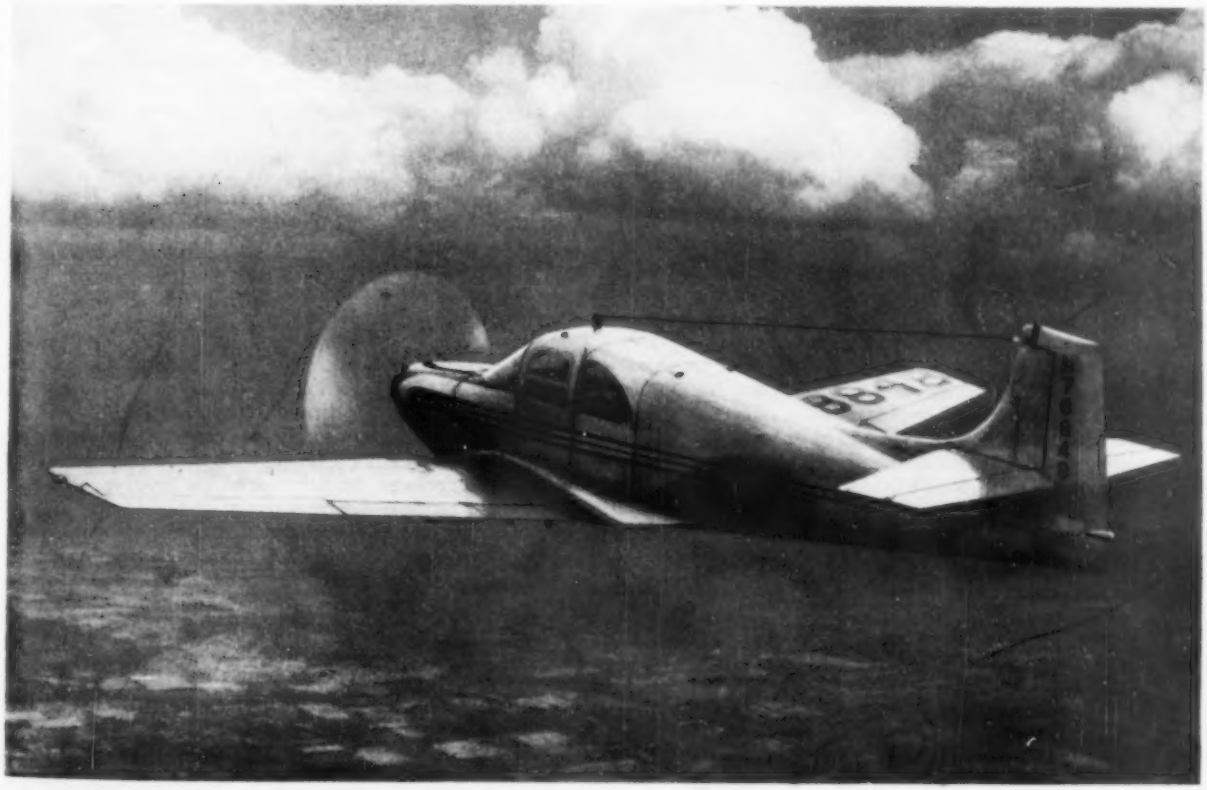
The weather cleared somewhat as we prepared to leave Henderson and I took my turn in the pilot's seat. Starting procedure is the same as on most ships of this type: Master switch, mixture control, magnetos, throttle cracked, wobble, "clear", toe brakes, and "hit-the-starter" button. After about six revolutions, the big "paddle-blade" Hartzell controllable-pitch propeller started singing its six-cylinder song.

Taxiing down-wind and cross-wind is exactly the same as in the Culver or Temco. You have to hold it with brake on lee side. The little tails on these high-speed airplanes don't contribute much force on the ground at low speeds. However, the wide landing gear provides quite a bit of control.

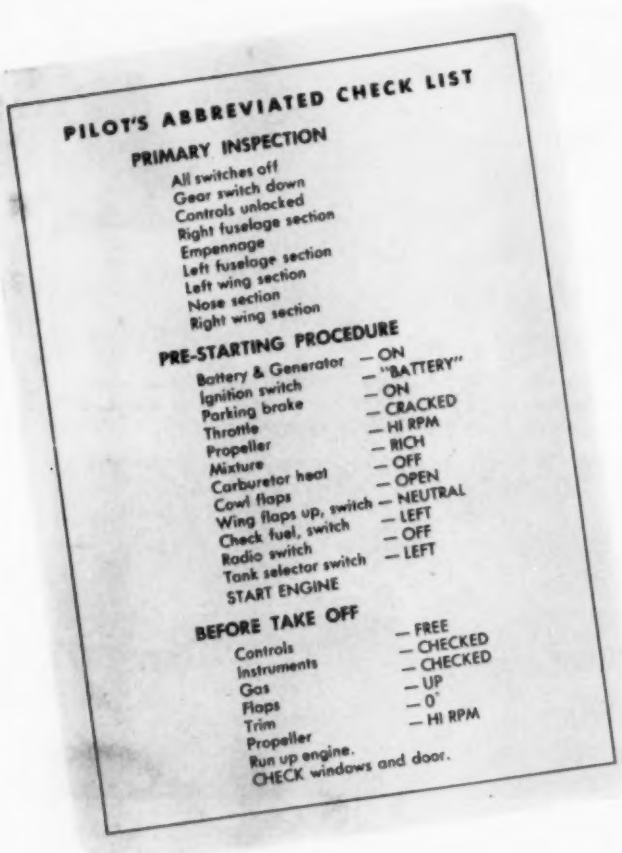
No flaps are needed for take-off, so with propeller knob in "full increase" position, I (*Continued on page* 62)

Even for a tall person, there is plenty of leg room inside. Control columns are on the side walls—out of the way.

Landing gear of the Bullet is wide, offering the pilot extra control during down-wind and cross-wind taxi runs.



The Bullet has excellent directional stability and its visibility is good except in ascent attitude, according to FLYING's check pilot.



PILOT'S ABBREVIATED CHECK LIST

PRIMARY INSPECTION

All switches off
Gear switch down
Controls unlocked
Right fuselage section
Empennage
Left fuselage section
Left wing section
Nose section
Right wing section

PRE-STARTING PROCEDURE

Battery & Generator	— ON
Ignition switch	— "BATTERY"
Parking brake	— ON
Throttle	— CRACKED
Propeller	— HI RPM
Mixture	— RICH
Carburetor heat	— OFF
Cowl flaps	— OPEN
Wing flaps up, switch	— NEUTRAL
Check fuel, switch	— LEFT
Radio switch	— OFF
Tank selector switch	— LEFT

START ENGINE

BEFORE TAKE OFF

Controls	— FREE
Instruments	— CHECKED
Gas	— CHECKED
Flaps	— UP
Trim	— 0°
Propeller	— HI RPM

Run up engine.
CHECK windows and door.

Cultivate the habit of using a check list for every flight. It will pay handsome dividends.

Get That Check List

By WESLEY NEAL

DID YOU EVER drive your car half-way to work before noticing that you had left the emergency brake on?

"Silly question," you say. "I thought this was an aviation magazine. What goes with the automobiles?"

Simply this—whether on the ground or in the air, *Homo sapiens* is still a fallible creature. The same mental short circuits, which allow us to drive with the emergency brake on, are the cause of most airplane accidents. Forgetfulness is no sin. But it can cause a heap of trouble. Consider the case of an absent-minded pilot friend of mine. We'll call him "Joe" because that is not his name.

Joe was using the lightplane in one of its more practical applications—carrying him to keep a smooth date in a distant town with a luscious blonde. And what could be more practical?

Joe took off just before sunset. For understandable reasons, our friend's mind was not on his flying. He forgot to raise his wheels. In the darkness, Joe didn't see the lowered landing gear. It seemed to him that he wasn't making any speed. But it was not until he was more than an hour out that he discovered why.

The result of this bit of intellectual "ceiling zero" was not serious. Joe's date gave him a tongue lashing for being late. And that was that. Another flyer I know was less fortunate.

Let's call this arrogant aeronaut "Speed." That was not his name, either, but the title suits his temperament. This guy seemed to have more things to do than a tower operator at an air show. And, he was always in a rush.

One morning he took off on a cross-country from Los Angeles to Phoenix. In typical fashion, Speed flew direct instead of airways. His course took him right over some of the highest mountains in the area.

Before he ever reached the mountains, though, Speed was in a cold sweat. He couldn't get any airspeed. He hung the plane on its propellers and tried every trick in his not-too-clever head. No go. Finally he turned around and headed back for Los Angeles.

Still mystified, Speed brought the ship in hot, just in case. The poor boy ran out of runway and ground-looped the ship against a fence. When he pulled himself out of the wreckage, he discovered his trouble. He had forgotten to remove the pitot cover.

Now, these scattered examples represent a pattern of forgetfulness common to flying. Safety devices notwithstanding, an airplane is no robot. It responds to the pilot's touch. Today's aircraft are equipped with gadgets and instruments and aids which can make flying as safe as a ride on grandma's banister. But this axiom remains: The Joes and Speeds and all the rest of us have got to remember when and where and why to push and pull those gadgets. How best can we remember these things?

The best answer that I have found to this question is the check list. Used by airlines and the military for

1 Check that tachometer as you operate the prop from low to high r.p.m. and back again before your takeoff.

2 Don't forget that before your takeoff thorough check of the radio, as you run down the list of switches.

3 Here the pilot moves his flaps through the full cycle while he checks flaps and flap indicator.

Complex

years, the check list provides a safeguard for the pilot's fatigue, bad memory or plain foolishness. It is not perfect. Nothing dependent upon man will ever be. But it is an established fact that a check list, properly used, has averted more than one otherwise nasty accident.

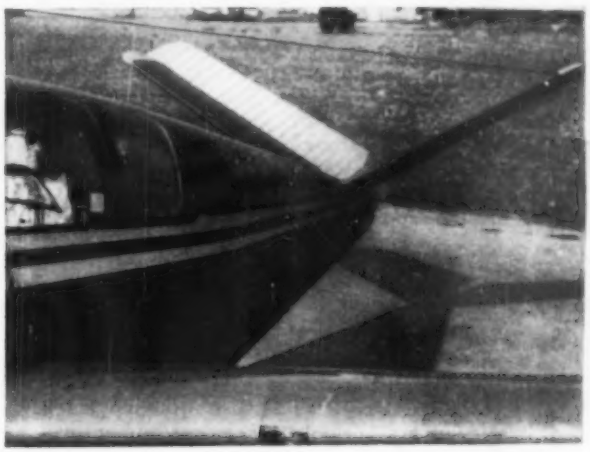
One chap I knew was an Air Force standardization pilot. His job was to fly with instructor personnel to make sure that all procedures were uniform. We'll call him Hank. (I hate to be so incognito about these names. But I'm still on speaking terms with most of these fellows and prefer to stay that way.)

Hank flew something like 225 hours in one month. No one knew it at the time, of course. But all of us sensed that something was wrong with the guy. Usually talkative and friendly, he got clam-mouthed and fish-eyed before the four-week period was up. One pilot who flew with him said that Hank would get out the check list on the downwind leg and go over the same things again and again.

Hank was nuts, of course, to risk his neck and a lot of good airplanes. When his batty record came to light, he was grounded for a month. But the point is he had sense enough to know that he was too bushed to rely on haphazard procedures. The check list was his salvation and he knew it.

The history of private flying is replete with the records of accidents which could have been prevented. At this writing, I have before me photographs and case histories from the Civil Aeronautics Board which prove this—instances where pilots cracked their heads or their airplanes simply because they forgot.

If private flying is to rid itself of (*Continued on page 54*)



4 Another must for every pilot concerned with flying safety is manual and visual checking of all other controls. It is part of pre-starting procedures.

5 Engine run-up just before takeoff clears cylinders and insures best operation before beginning takeoff roll. A Beech Bonanza pilot shows how it is done.

Know your E

Safety in the air depends on the full-rated power of a properly functioning engine.

By CARL V. ALLEN

IF YOUR LIGHTPLANE engine seems a bit sluggish and won't turn up as it used to, you are about to dig into that reserve for overhaul you have prudently built up at about 40 cents per flying hour. Or did you delude yourself you could fly for gas and oil?

A quick check of the logs may show that the engine was "majored" or "top-overhauled" a few hours back, or that it has run several hundreds of hours with no more than periodic checks. In either case, you must do something to bring that engine back to par, because your own safety makes it mandatory that an airplane engine be able to produce its full-rated power at all times.

If something more than a minor adjustment is necessary, you must decide how far it is economical to go toward a complete major overhaul while the engine is partially dismantled.

The decision as to how much of a complete airplane engine overhaul should be accomplished at a given time during the life of an engine is an important one, and should be placed in the hands of a competent CAA rated engine mechanic or repair station experienced in the particular model in question.

If you, as the owner, have had that experience the problem is simplified. Remember that the solution to the problem of what to do now to revitalize your engine must reconcile four basic facts: (1) hours since top and major, (2) hours of life expected before next top or major, (3) hours you anticipate flying the engine before sale or trade-in and (4) the present state of your finances.

For example, if two or three cylinders must be pulled to correct valve seat leakage, it may be wise to replace all piston rings at the same time. If however, the trouble involves only a fouled plug, a pitted set of magneto points or even a single sticky exhaust valve, then perhaps only that item need be taken care of for the time being.

For the benefit of those who have heard and used the terms but don't know exactly what they mean, here is what is meant by "top overhaul" and "major overhaul" and what is entailed when factory exchange of an engine is dictated:

TOP OVERHAUL: This consists of removing baffles, cowling, cylinders, rocker arms, valves and springs, pistons, pins, and rings. Depending upon the thoroughness of the mechanic or shop performing the work, all traces of carbon are removed from these parts and new piston rings are fitted into the piston ring grooves. The clearance between ring and groove is extremely important and usually the rings must be reduced in thickness by rubbing them with emery cloth.

One thousandth of an inch too little, or a couple thousandths too much may reduce time between overhauls by as much as 100 to 200 hours. Valve guides are reamed of all hard carbon, valve faces ground or lapped or new valves installed if they are warped or badly worn, and valve seats stoned or lapped. Valve guides should certainly be checked and replaced if they are worn beyond limits. Pistons and pins are usually not replaced at top overhaul; the plugs which position the pins in the piston may or may not be worn sufficiently to need replacement. Connecting rod bearings are rarely touched.

MAJOR OVERHAUL: A major consists of all of the above operations, plus complete diassembly of the crankcase, crankshaft gears, cam followers, and valve lifters. These parts are all cleaned and inspected for minute cracks by a process called "magnafluxing," which employs the use of an electric current and magnetized iron filings. A new X-ray technique is also beginning to come into more general use for locating cracks. Bearing inserts are installed and if the crankshaft is worn beyond certain tolerances it is reground to ten one-thousandths undersize. Wear beyond this requires a new crankshaft to the tune of $150 to $160 in the case of a four-cylinder engine.

New wrist pin bushings and piston pins are usually installed and if the cylinders are worn beyond manufacturers specifications they are either reground to oversize or factory exchanged for new ones. Three years ago it was standard practice to install new pistons but now with the price so high they are usually cleaned and reinstalled. Accessories such as carburetor, magnetos, starters and generators, also may or may not be overhauled at this time depending upon total time on these items.

Before the war, a magneto would outwear an engine but somewhere down through the years the desire to save a few dollars or ounces has caused the introduction of new models not yet entirely proven. Perhaps the need for impulse couplings with electric starters has been a factor requiring a weight saving at other places in the magneto.

FACTORY EXCHANGE: This consists of the removal of your old engine from the aircraft and exchanging it complete for a so-called "factory remanufactured engine." The new engine will have zero hours and will contain standard cylinders, pistons, etc. It may contain an undersized crankshaft, which could mean that if not again exchanged at the factory, the next overhaul of this engine might be extremely expensive. A new crankshaft costs $160, plus other parts. Factory overhauled magnetos, carburetors, starter and generator, if any, and ignition harness and spark plugs are also included in buying a factory exchange engine.

With the above definitions and descriptions as a basis, we should now be able to arrive at some general conclusions when faced with an engine problem. If a modern lightplane engine has been used for cross-country and run at from 50 to 60 per cent of rated power, except for short full throttle operations during a few take-offs per hour, it will usually equal or exceed manufacturer's recommended time between overhauls.

If however, it is used as a training ship or if the pilot firewalls the throttle or otherwise abuses the engine, it may be necessary to top or major the engine sooner than manufacturers recommendation. (*Continued on page 59*)

ENGINE

Use table to find out what is causing engine trouble and whether it needs replacement parts, major overhaul or factory exchange.

SYMPTOM	TROUBLE	REMEDY	COST
Engine doesn't turn up, is rough, or no compression on one cylinder	Valve stem sticking in guide	Remove affected cylinder, ream guide, grind valve	$12-30
Loss of power, engine rough, blow-by heard through exhaust	Valve faces or seats pitted and not sealing	Remove all cylinders, reface valves, grind seats, replace guides	$60-75
Loss of compression, excessive oil consumption, leakage heard through crankcase	Worn or stuck piston rings	Top, major or factory exchange	$100 $175-350 $550
Loud noise, loss of power, very rough operation	Broken piston	Replace affected piston, possibly cylinder	$35-100
Loss of power on one magneto	Spark plug failure	Replace	$1.50 plus labor
Engine stops when run on one magneto	Magneto failure	Replace points or parts Overhaul	$2-5 $9-25
Engine stops at idle	Carburetor out of adjustment	Readjust	$2-7
Carburetor floods, or fails to take throttle	Faulty float, clogged jets, dirty	Overhaul	$6-15
Oil leaks	Faulty gaskets, seals	Replace	$1-20

FLOATPLANE HAZARDS

A pilot who knows the country well offers tips on how to handle a floatplane in the Arctic.

By HARMON HELMERICKS

Floatplane anchorage can be improvised by attaching rope ends to two heavy rocks. Free rope ends are to front of pontoons.

MOST OF MY floatship flying has been in arctic Alaska and Canada where ground facilities for caring for airplanes are singularly absent. On the flat prairies of the arctic coast of our continent the winds often reach velocities of 50 miles an hour, and 80-mile winds are not uncommon. Yet even 80-mile velocity is not the top velocity which may occur.

The tie-down equipment we carry in a small aircraft is usually limited to three three-eighths inch ropes about 20 feet long, and a small ax. To handle your airplane during the worst storms the arctic has to offer with such meager tie-down equipment calls for ingenuity plus originality, and is probably the acid test of a pilot. I make no claims to either, for the methods here described I picked up from the Eskimos, who are skilled in tying down their tents, boats, and sleds, and from the old bush pilots who were flying when I still wore three-cornered pants.

The prime factor in successfully weathering a storm

In addition to tying-down, pontoons filled with water weighted the beached Cessna enough to withstand Arctic snowstorms.

Beaching a floatplane on rocky land in the Arctic can be tricky. If caution isn't exercised it could severely damage pontoons.

of the Arctic

As residents of North Alaska, Connie Helmericks and her husband rely on their Cessna 140, the *Arctic Tern*, for most of their transportation.

is to pick out the best area available in the first place. When you are flying in a storm you are far too likely to land as soon as you can in any place that is available, but you may regret your haste if it means losing your plane on the ground!

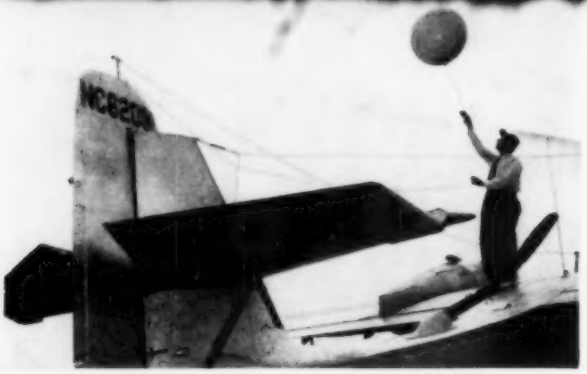
A seaplane ranging far afield is like a boat. You must find for it a safe harbor. No matter how hard the storm is blowing up, if you are flying over unfamiliar country and are going to land, be sure to study your intended area with care. Look for some little sheltered bay, an island you can get behind, a slough you can taxi up. Study the upwind shore carefully. Don't land on the downwind side of a body of water during a storm, for here the waves will be the worst and your chances of shelter the smallest.

The main thing is to take your time about deciding where you will come down and know where you want to be after you are down. What looks like an open book from the air may be a closed one from the water. So know your surroundings before you come down. It is much easier to make a safe descent on water than on land during a blow. The winds are usually steady over the open water and you always have a direct into-the-wind landing unless of course you are landing in a narrow river, but even here you have a small choice. You can generally find a sheltered spot where the waves are small and then land as near your desired harbor as is possible.

The kind of beach you have for your seaplane means a lot. A sandy beach free from rocks, is ideal, with the water deep enough beside it to allow the airplane to run right up to the beach. A mud beach ranks next, not because of its beautiful mire, but because mud won't injure the floats. A rocky beach is the worst of all, for it will batter up your floats if you aren't awfully careful. A set of floats such as the Edo floats are very tough and they will take quite a beating. I have used mine as skiis on ice and snow and they have had unusually rough treatment in general, with never a leak, but I am always doubly careful around rocky beaches.

If the weather is calm, you need not be fussy about where you land, except to remember to keep in the back of your mind always some safe harbor within possible reach if a sudden storm should develop. In choosing a more or less permanent camp site with an airplane this is of utmost importance. The easiest way to make a float plane safe for a little while is to simply pull it up tail first upon a smooth beach. Then tie the tail or, preferably, tie both wings to some solid object, like tough ground willows or saplings. Freak whirlwinds make the wing ties the safest. But always *tie it securely*, for tides, rising water, wind and waves can carry your airplane away. In case you are one of those who like to learn by experience, that is a wonderful way to learn. I learned the hard way, too.

It was along the arctic coast of Alaska at the village of Wainwright that I had the advantages of tying my ship securely pointed out to me by Mother Nature. It was August, and fog had forced us to (*Continued on page* 42)



Brandenfels releases a weather balloon to carry 200 feet of radio antenna aloft when there is no wind for a box kite to do the job.

This executive plane has everything — seven radios, omni, ILS, dental floss and a canasta deck.

Brandenfels' Wonderful Widgeon

The *Widgeon's* owner has his pick of five transmitters aboard his well-equipped plane. Here he tries out the 12-watt Harvey Wells.

The Narco URA-1 receiver which Brandenfels is tuning in is part of $4,000 worth of radio equipment he has put into the *Widgeon*.

By LEVERETT G. RICHARDS

CARL BRANDENFELS transacts his million-dollar hair-preparation business almost exclusively by air. He logs more than 600 hours a year traveling from coast-to-coast in a *Widgeon*. This way he is able to be in personal touch with the some 40,000 people who buy his product.

An energetic air enthusiast, he not only uses the airways for his business and pleasure, but also to oversee his 36-acre filbert nut farm. The part-time flying farmer's home-base and farm is near the town of St. Helene, Ore.

He bases his twin-engine plane at Scappoose Airport. He traveled the 12 miles between home and airport by Stinson. He sets it down on a 1,200-foot landing strip which was built right near his front door.

On the topmost peak of Brandenfels' $250,000 electronic-equipped house is a beacon light which can be remotely-controlled by radio to illuminate the airstrip. He devised this control system himself, adapting it from the one used to guide target planes during the war.

The *Widgeon* is equipped with seven radios and other advanced paraphernalia not yet in general use. Fully-equipped for instrument flying, the plane is outfitted with the new omni-directional VHF radio ranges. The ILS system used by many airlines has been installed for instrument landings.

Safety is Brandenfels' hobby and he has made use of every conceivable safety device, including a survival kit which contains everything from penicillin to dental floss to a Canasta deck. His best and most loyal friend, however, is his Narco VHF omni-directional range receiver.

"I was always getting lost," he explained. "Even on flights to Seattle, just 135 miles away, I'd be wondering just where I was. So, I got the omni receiver. Now all I do is point the *Widgeon* toward the omni station and keep the needle centered. I always get there, even when I have to hold a 40° correction for wind."

Brandenfels found omni navigation to be just as simple on a recent Portland Chamber of Commerce-sponsored tour to Cuba. It was another story in pre-omni days, however, when he joined a group tour from Portland, Ore. to Portland, Me.

"We were lost most of the time, even with the aid of an instructor," Brandenfels re- (*Continued on page 58*)

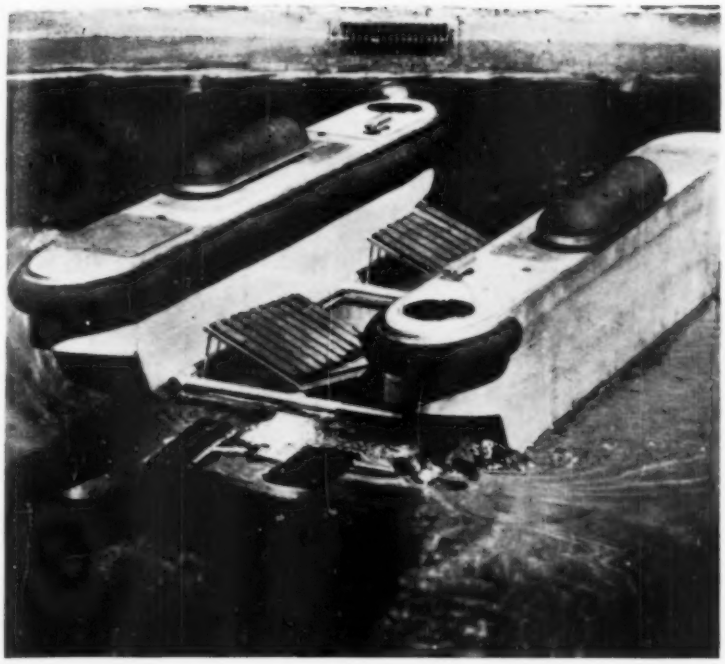
Five-inch HVAR rockets streak from the Northrop F-89 *Scorpion* in air-to-ground firing near Edwards AF Base, Muroc, Calif. The 16 rockets, eight under each wing, now supplement the six 20-mm cannon, making the plane the most heavily-armed of the USAF.

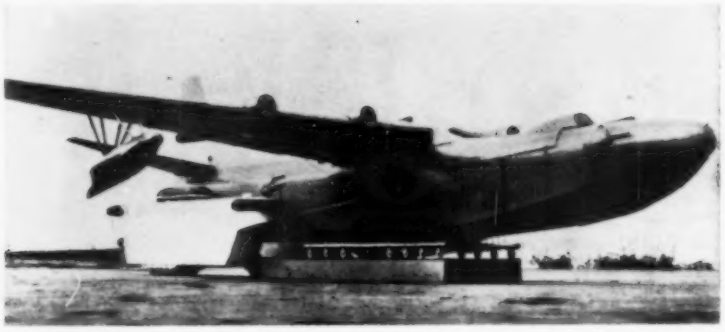
The Sud-Est *Mistral* is a French-built modification of the *Vampire* MK.5. The air-intakes in the wing roots have been enlarged, the cockpit redesigned and an ejector seat added. The Hispano-Suiza *Nene* engines have given the plane a top speed of over 595 m.p.h.

One of the K-225 helicopters has been adapted by Kaman Aircraft to act as a prototype for Navy HTK-1 (top). The modified *Dogship* (bottom) has a faired-in tail which is expected to increase speed 6 to 8 m.p.h. The tail area also has been increased.

Turbomeca Palas 352-lb. thrust turbojet fitted under fuselage by French enables DC-3 to take-off with a 29,000 lb. gross.

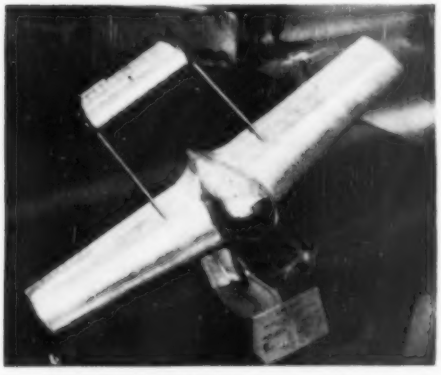
British experimental jet H.P. 88 (top) high-speed prototype with experimental wing is powered by Rolls Royce Nene turbo jet engine. DeHavilland Sea Venom jet fighter (bottom) has DH Ghost engines, rated at 5,000 lb. thrust.





Edo seaplane beaching gear (top) submerges, moves in all directions and crawls out of water on power-driven tread with 300,000 lb. plane (bottom) on its back.

Bonmartini tubular track landing gear has been fitted to British Auster J.5. It is claimed to actually improve performance.



SIPA S.200 (model shown) is used for jet transition or high-speed liaison training.

Dutch Fokker S-14, first jet trainer design, has a Rolls Royce Derwent 3,700 lb. static-thrust engine and has pneumatic dive brakes on sides of fuselage. Ejection seats are side-by-side. Top speed is 440 m.p.h. at a 25,000-foot ceiling.

Navy Transport R5D's white side-wall tires started as a joke but proved to be of value to control towers for night landings.

I Learned About Flying From That! NO. 142

Bolts bolt propeller on L-6 flight over Texas Brush and a pilot learns the value of conforming to CAR.

By DIP DAVIS

DID YOU EVER thumb through a copy of Civil Air Regulations and think to yourself: "Man, there's enough red tape here to choke a horse. I use common sense—and if I break an occasional little regulation it's nobody's business but my own"?

I used to have that attitude myself. A slight oversight of just one line in the book cost me no end of embarrassment, and I can't even offer ignorance of the law as a feeble excuse. I knew darn well what the book said but just figured that it was too much bother to comply. Let me give you the facts and you can judge for yourself.

It's a long way between towns on the broad expanses of the West Texas Plains which is good for the aviation business. It's smart to save time by flying, but it does pose a few problems which are probably unique to this section.

I operate a small maintenance and repair shop on the local airport and take care of annual inspections for the airplane owners in this area. It's human nature, I guess, for any pilot to fly his plane right up to the expiration of the airworthiness certificate before bringing it in for relicensing. If he does happen to get it in early, it will be the time that I'm swamped with a dozen other jobs that must have priority. The ticket will expire before I can get to it.

Most of you plane owners are probably familiar with relicensing procedure. A licensed mechanic goes over the plane and cures all the ills; makes out an inspection report; and then submits the airplane to a designated maintenance inspector who pronounces it airworthy for another twelve months period.

It's fifty miles to the nearest designee in West Texas. The CAR states that if the airworthiness certificate has expired, a ferry permit must be issued before that airplane can be flown. They make it plenty easy on us, too. All they require is that you call the inspector to tell him you're bringing the plane over for a check. He writes out the permit from the information you give over the phone. Nothing could be simpler, but sometimes even the easiest procedures get you down.

The particular airplane involved in this tale was an Interstate L-6, an overgrown *Cadet* with a profusion of window space and a 113 h.p. engine. The plane had been in dead storage for an extensive period. The engine had very little time since overhaul and ran nicely. The airframe, however, required a good deal of work before relicensing. The airworthiness certificate had expired over a year ago.

I finished going over the ship (*Continued on page 61*)

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AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is: "To make flying more useful, less expensive, safer and more fun."

Headquarters address is: Box 5960, Washington 14, D. C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

DISCRIMINATION PROTEST

AOPA has formally asked the chief of the U.S. Weather Bureau, Dr. F. W. Reichelderfer, to consider the possibility of transferring the present primary aviation weather stations at LaGuardia Field (New York) and Standiford Field (Louisville, Ky.) to airports in their respective areas that do not discriminate among those who fly.

Contending that those Weather Bureau installations are installed and paid for by the Federal Government, AOPA bases its request on the fact that such installations are intended for the use of the majority of flyers, without discrimination. Both LaGuardia and Standiford Fields will not permit pilots to land there to use those facilities without paying a prohibitive landing fee.

AOPA has requested that the primary Weather Bureau station be moved to Teterboro airport in the New York area, and to Bowman Field at Louisville. Both are "unrestricted" airports, and such a move would permit pilots to visit with Weather Bureau experts and consult with them before starting a flight. AOPA—along with the Weather Bureau itself, and CAA—has long urged pilots to consult with trained Weather Bureau personnel in person, resorting to telephone conversations only when absolutely necessary.

In its formal request, AOPA pointed out that airline pilots rarely consult with Weather Bureau personnel, relying entirely on the airlines' own meteorologists and the teletyped weather sequences. Thus the airlines' needs would probably be amply served by the kind of teletype drop now operated in the secondary Weather Bureau installations such as those currently in use at Teterboro, Newark and Idlewild in the New York area, and Bowman at Louisville.

MAP SERVICE UP

Demands on AOPA's Map Service have increased greatly since the U.S. Coast and Geodetic Survey discontinued dealers throughout the country. Most airports were acting as dealers.

In explaining the dropping of all dealers to AOPA, C&GS officials pointed out that the sale of obsolete charts had become so widespread that the Government agency no longer had any effective control over the problem. The only solution, they decided, was to eliminate dealers and work only through distributors. AOPA is a distributor.

The result of this policy has been to cause many airport operators to drop aeronautical charts entirely. Hence AOPA has had a substantial increase in the volume of its map sales. It now is a daily occurrence for the Map Department at National Headquarters to receive numbers of telegrams and long-distance phone calls for up-to-date charts.

OMNI CHECKUP

AOPA is cooperating with the Government's Radio Technical Commission for Aeronautics (RTCA) in a new project to locate and investigate all faults with omni experienced by pilots. The project is being handled by RTCA's Special Committee No. 60.

All pilots using omni are urged to advise either RTCA or AOPA National Headquarters of any difficulties or malfunctioning of omni equipment, both in the air and on the ground. When sending us reports, be sure to include the date, time, altitude, type of plane, type of airborne equipment, identity of ground facilities being used, and full details on the trouble experienced.

VHF CHANGE

Some changes are taking place in the VHF radio frequencies used by non-airline civil aircraft. The major changes involve transmitting frequencies of CAA range stations, and do not affect the present frequencies in civil aircraft transmitters.

The most important change to aircraft with VHF receivers is the discontinuance of 111.1 mc ground-to-air frequency at all CAA range stations. Frequency 122.2 has been assigned as a replacement, but will not be available at all CAA range stations until July 1, 1953. However, some range stations are already equipped.

Pilots are cautioned to consult the latest Notams to determine those stations already operating on 122.2.

IDENTIFICATION CARDS

CAA has asked AOPA to again warn all pilots that the new identification cards must be in each pilot's possession by September 1. The cards are mandatory, and a CAA pilot's certificate is not valid after September 1 unless accompanied by that card.

ACTIVE "ACTIVES"

AOPA's new Active membership category is going over with a bang. The new classification costs $10 per year and features a number of new advantages, including a $700 insurance policy at no extra cost. In addition, all special services are free, while the $5 regular membership, which AOPA is continuing for those members who do not need more active participation, now is confined to receipt of the regular subscription to FLYING Magazine, and access to the special insurance program available to all AOPA members.

WOLF IN PARIS

Alfred L. Wolf (AOPA 5), AOPA's general counsel, is on active duty as a lieutenant colonel with the U.S. Air Force in Paris.

AOPA WATCH POPULAR

AOPA's new 24-hour watch, designed and manufactured for the association by the Elgin National Watch Co., has been so well accepted by AOPA members that National Headquarters now is considering placing a new order with the Elgin company.

The unusual new watch (see photo) has a 17-jewel movement resistant to shock, water and dust, and has Elgin's exclusive alloy mainspring which is guaranteed for life. The special price to members ($49.50) is lower than the retail price of Elgin's comparable standard 12-hour watch.

Best Lightplane

(*Continued from page 23*)

the yellow star is that against a dark background the drab red star paint does not show up well—and Red army gunners are just as trigger-happy as any other gunners around the world.

The Yak-14 appears to be the best liaison type aircraft yet produced by the Russians, one that compares favorably with American planes in that classification. The appearance of this "Flying Grasshopper" indicates that the Russians, who have watched the operation of UN lightplanes in Korea, now realize the importance of this type in military tactics.

Although the Red Air Force (now known as the Military Air Fleet of the U.S.S.R.) was created in 1918, no provision was made for light observation planes up to the time of the Great Patriotic War (1941-1945). The Red Army had to rely on the perennial U-2, a two-seat biplane first built back in 1927.

When designer Nikolai N. Polikarpov died in 1944, the biplane U-2 was renamed the PO-2 in honor. But while the U-2 was used to supply partisans behind German lines, for after-dark ambulance rescue and even glide bombing, it was primarily a training aircraft. Thousands have been built and many are still in use.

☆ ☆ ☆ ☆ ☆ ☆ ☆

While a student at Stanford University, I flew three students and myself to Los Angeles for a football game. I agreed to pick up one of the fellows at Burbank Airport on the return trip.

Not knowing at the time that Burbank and Lockheed airports were one in the same, I supposed Burbank Municipal to be the field on my chart about five miles from Lockheed and labeled Grand Central.

Burbank tower radioed my clearance to land as I came in on Grand Central. After parking on the ramp before the tower, Burbank came over again:

"Fairchild 232, what is your position now?"

Rather taken aback, I replied: "Burbank Tower, if you don't see me on the ramp before you, I don't know where I am."

There was quite a pause before he came back:

"Fairchild 232, you are at Glendale Airport. Tune to 201 Kc."

—Ray H. Elsmore

☆ ☆ ☆ ☆ ☆ ☆ ☆

It is strange to witness the "stick and string" PO-2 almost rubbing wings as it were with the new, sleek, swept-wing Mig-15 jet fighter. And this will continue until the air fleet has sufficient quantities of the new Yak-14, because among other duties the PO-2 is used by senior officers as an air regimental "hack."

Before the war ended, the Soviet Union began to toy with the idea of a specialized "flying grasshopper." Several layouts were tried, among them being the low-wing, three or four-seat Yak-12 and the Mig Utka (Duck).

The Yak-12 was soon shelved in favor of the braced high-wing Yak-14. Novelty was the keynote in the layout of the Utka, which was publicly displayed for the first time at the Tushino airdrome, near Moscow, on Aug. 18, 1946—Soviet aviation day. A composite ski-sled and tail-first braced, high-wing pusher with three seats, the Utka has not been heard from since that time, although it was officially announced that the design was destined for mass production. Russia has favored the use of armored ski-sleds, but it is fairly safe to assume that the flying qualities of the Utka outweighed the ground use factors.

Top designer Yakovlev took time off from detailed engineering on piston and jet fighters and transports to lend his experience in the quest for the perfect light liaison ship. The outcome was the Yak-14, which is presented in its 1945 form alongside the modified and superior 1951 version.

"Russia's Jets and Other Aircraft," a booklet recently published by William Green and Derek Wood in England, has this to say about the Yak-14:

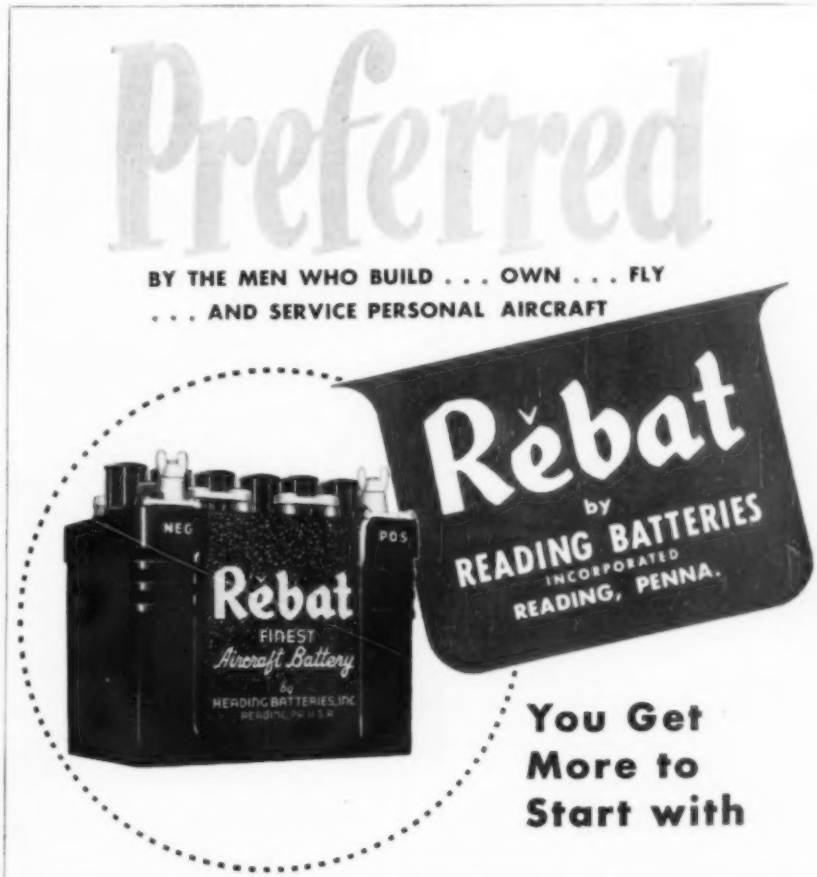
"Intended as a maid-of-all-work, from gun spotting to training, the Yak-14 follows the general layout of most modern four-seat light planes of the Auster *Autocar* and Cessna 170 type.

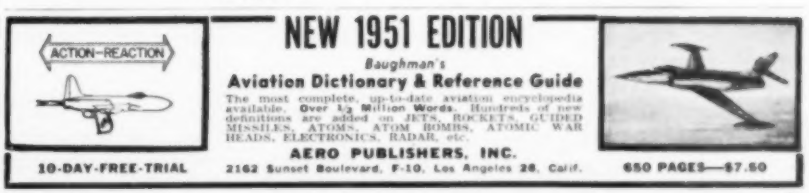
"It's helmeted engine cowling is similar to that fitted on the Yak-8 and Yak-18. A spinner is optional.

"The constant chord wing is vee-strut braced to the fuselage and, in addition to split trailing edge flaps, has stall-delaying slots along the whole leading edge. This combination gives the machine exceptional slow-flying qualities. The main undercarriage legs are of the split-axle, steel-tube, vee type, wire-braced, and wheel spats can be fitted.

"Dual controls are standard, but the enclosed cabin is not particularly roomy, especially with four people up. Both fin and tailplane are wire braced, and the fully castoring tailwheel is fixed.

"In the event of an emergency, it is probable that the Yak-14 would be seen in some numbers and it will, in many cases, take over duties from the PO-2, which has been in service since 1927." END

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Floatplane Hazards

(*Continued from page* 33)

fly low along the edge of the beach all day long as we made our way from Kotzebue Sound north toward Point Barrow. Now the ceiling had vanished entirely and we were forced to put in to the lagoon of ocean water lying back of Wainwright. There seemed to be nothing whatever to tie to on that bare beach, so I "tailed" our Cessna 140, the *Arctic Tern*, up on the beach and tied the wings and the tail to small pieces of driftwood that I buried in the sand. Rain began to fall; there was no wind. When the Eskimo children came from the village about a mile distant across the tundra we left the airplane and followed them back.

Once inside the warm Government School, Connie and I quickly forgot about our airplane and we didn't hear the wind slowly rising. Once during the night I awoke to hear the ocean crashing on the beach outside the lagoon. I didn't sleep too well the rest of the night, for that was an off-shore wind. Luckily that lagoon was sheltered from the ocean's wildness by a strip of land. But it was a low strip of land, and the lagoon opened by a big mouth right into the ocean.

Next day it was with a slight apprehension that I made my way after Connie, who had preceded me, to the spot on the lagoon where we had left the

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

"Flying Machine soars three miles in teeth of high wind over sandhills and waves at Kitty Hawk on Carolina Coast." Norfolk Virginia Pilot, December 18, 1903.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Arctic Tern. The fog had lifted and we were ready to fly on. But where was our airplane? The spot where we had left it was empty!

The shore jutted out with a high cut-bank hiding a small bay behind. It was the only place where the airplane could be! It was a slim chance indeed. With a heavy heart I walked around the curve after Connie and just then she called: "Well, look, Bud, our airplane has broken loose and is drifting on the water here!" I almost collapsed with relief.

The *Arctic Tern* was just drifting in to touch the shore as we approached. A broken rope trailed from each wing while another from the tail towed a small pile of driftwood sticks behind it. What a trip she must have had! How far out to sea had she gone? Lucky for us the off-shore wind had changed shortly after it rose or the *Arctic Tern* would have landed in Siberia.

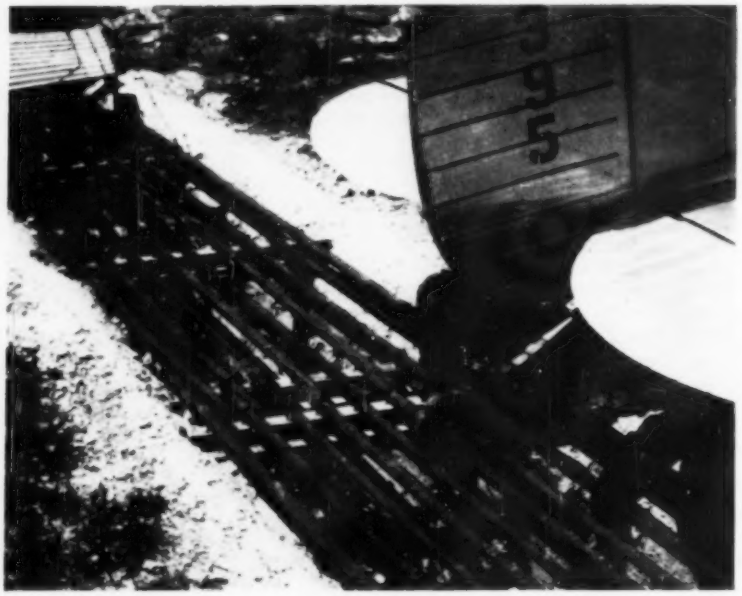
The moral of this story is: Tie her securely and then tie her again, even if you are working right beside the airplane.

You can always make fast to a floating buoy or use an anchor, if one is handy. A suitable anchor can be made by filling a sack with sand. After tying a rope securely about it, throw it overboard in the right place. A rock of about 75 pounds will do also if you can tie a rope securely to it. Then a bridle can be tied to the bow of each float. In this way the airplane can swing with the wind.

It is a good idea to use two anchors on separate ropes just in case one comes loose. The anchorage should of course be sheltered from waves and there must be ample room for the airplane to swing. If the area is restricted, you can tie an anchor line to the tail as well, to prevent swinging. An airplane properly anchored can ride out almost any storm safely and easily. Airplanes anchored off shore are safe against any marauders.

(*Continued on page* 52)

AIRSTRIP CATTLE-GUARD



I USE MY CESSNA 140 to visit my father on his farm in Exeter, Mo. The 1,300 foot landing strip on the farm was just too short for comfort. The adjoining field belongs to a farmer who uses it for grazing. He had no objection to my plane landing on his field occasionally, but it was also only one-quarter of a mile wide. A cattle-guard crossing provided the solution to using the two quarter-miles as a half-mile strip and still keep the cattle separated.

The mechanics of construction are simple and any handy man can make one in a few hours, at a cost of less than $50.

First, these factors should be taken into consideration: 1) the type of cattle to be turned; 2) the skill of the pilot; 3) the weight of the aircraft; and 4) size of the wheels of the plane.

Since the average cow can jump even a five-foot ditch, dig a trench about seven or eight feet wide and two feet deep. The trench has to be longer than the landing strip is wide. The pilot's flying experience will determine the width of the runway. A former "Grasshopper" instructor, I found that a 30-foot strip is adequate for my operation but 60 to 75 feet should be considered the minimum safe width.

The crossing I made has concrete walls and wood cross-members, which are covered with used three-quarter-inch pipe. However, you can substitute all wood or all metal for the materials.

The six-inch concrete walls are run six-inches lower than the bottom of the trench and should be flush with the runway surface. The four by six inch cross-members are set in the top wall before the cement sets. Care should be taken to see that they are set below the edge of the walls. They should be exactly the width of the pipe to be used on top. This is imperative if you are to prevent a bump in the runway. The crosspipes vary in spacing from four to eight feet apart, depending on the pipe used and the weight of the plane.

The spacing of the pipe on top will depend on the size of the tail wheel. The wheel should roll across the pipe without dropping between them. To fasten the pipe down securely, "U" bolts or large spike nails are recommended. If spikes are used they should be bent over the pipe in order to hold it in place.

The ends of the "bridge" should be prominently marked and the fence should slope up out of the trench beyond the markers.

I was able to keep the cost down by using old pipe and the gravel for the concrete was obtained from a nearby stream. Built in the fall of 1947, it is still in use and is in top condition. It is worth the time and effort when you consider the money saved on plane and fence repairs when running through the railings.

—HAROLD D. WEATHERLY

LOGGING TIME

WITH HY SHERIDAN

Captain, American Airlines

AND A LITTLE CHILD . . .

Certain pairs of things are naturally out of harmony with each other, such as roses and polecats, pepper sauce and burping, cats and dogs, and among these, sad to relate, are pilots and engineers. The pilots think that the engineers haven't got enough brains to oil the rocker bearing of a Swiss watch, and the engineers think that the pilots could pool their brains and make an atom bomb out of them and the resulting explosion would not disturb a flea. What bothers me is that they may both be right.

Well, it may have been the low opinion of pilots on the part of the engineers or it may have been on account of Sadie the Stewardess who knows that a good man is hard to find. At any rate, the airlines' pilots have been given a strange warning.

You know in the pilots' cockpits of the airliners, those sliding windows on the sides? You've seen them at the airports, when the airliner taxies up to park at the gate, the pilot slides open his window and looks back at his landing gear wheels as though in some surprise to see that they are still on? Well, on the metal frame of the window, at least on the DC6s and DC6Bs of American Airlines, is stenciled in red letters:

EMERGENCY EXIT. DO NOT USE IN FLIGHT.

* * *

DO YOU REMEMBER WAY BACK WHEN

Do you remember how we used to test the power of our engines? When we used to tie the tail of the airplane to a tree with a line that had a spring scale in it? "Static thrust" is back in fashion again, isn't it?

* * *

MANUFACTURING NOTE

The Kremlin may be wondering now if it is for them that the Bell tolls. Bell has come out with a truly doggy plane. When it wants to go fast, it lays its ears back. The fighter is nearly a straight wing for landing, and a swept wing for getting the hell out of there, for in this respect the wing may be changed in flight.

Which reminds me that, and this was before airplanes had parachutes, I flew a fighter in which the wings came off entirely. It is understood, though, that this was not intentional on the part of the designers. They didn't know me at all.

* * *

Motto for thunderstorm pilots: Hail and farewell.

* * *

The world is going much faster these days, but the trouble is we are headed in the same old direction.

* * *

TOMORROW'S YESTERDAY'S TODAY

Well, we've already got that airplane that flies faster than the earth turns around, the Douglas 558-II Skyrocket. William Bridgeman flew the thing a reported 1,326 miles an hour. Naturally, we are going to make fighters out of such planes and they should be very effective for some types of pilots, like myself. You can take off today and fly West and sneak up on the enemy yesterday.

And even in peace times, if we are ever to have such funny periods again, some of us might find such a plane quite useful. I would like to go back to yesterday and find out what the hell I did with it.

* * *

OVERHEARD IN THE LOUNGE

Two passengers were talking. "Personally," one of them said, "I think that Shaw is on a plane with Shakespeare."

"Oh," Sadie the Stewardess interjected, "where are they going?"

* * *

THE FEMALE MIND

The man in the lounge leaned over to Sadie and said, as an ice breaker or opener, "Do you like to fly?"

"Oh, yes," Sadie replied.

"Why?"

"On account of a pet frog we had on the farm."

"My goodness!", the passenger breathed, somewhat awestruck. "A frog?"

"Yes," Sadie explained. "You see, we had a pet frog, or at least Barney did, Barney is my little brother, and he got warts from him, that is, the boy got warts from the frog, the frog already had his, you see. Well, we couldn't make the warts go away so I took him to town to see a doctor, and the doctor had a nurse who had been a stewardess on the airline when stewardesses used to have to be trained nurses although my gosh the only kind of nurses we need nowadays is wet ones, well, the nurse told me that the most efficient way to get a man is to be a stewardess on an airline because the man won't be able to get away for some time, that first step out being a doozy, you know, and it wouldn't be any time at all until some gentleman would lean over to ask me 'Do you like to fly?' So I like to fly on account of a frog. I hope that is clear to your old slow stuffy male mind, but I am just joking—ha!"

* * *

THOUGHT FOR TODAY

Many a man who has waited for the breaks, is broke.

* * *

EPITAPH

Feathered birds can fly sans gas,
Human birds can never;
He failed to watch his winds, alas
And here he is forever.

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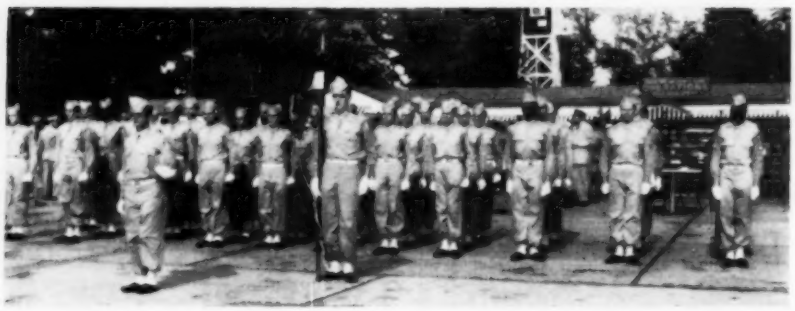
CIVIL AIR PATROL

WING TALK



N. Y. Wing Takes Honors

NEW YORK WING'S crack drill team (above) marched off with the 1951 National Drill Championship and the George Stone Memorial Trophy as they outmaneuvered regional champs from seven states and territories at Andrews Air Force Base, Washington, D. C., late in July. Next stop for the New Yorkers was to be the International Drill competition in Toronto, late in August, where they were to try for the first U. S. win since the International meet was inaugurated three years ago.

In winning the National meet, the New York team defeated regional champions from Washington, Michigan, Louisiana, Utah, Georgia, Hawaii and Puerto Rico.

The New York team was commanded by CAP Captain William Whitehead, while 18-year old Cadet Captain I. B. Abrams acted as drillmaster.

Tenth Anniversary Celebration

ALL CAP UNITS have been advised by National Headquarters not to take any action to have a "Civil Air Patrol Week" or "Civil Air Patrol Day" proclaimed in their localities this year inasmuch as CAP's Tenth Anniversary comes up in December and plans are being made for a special "day" at that time.

Rescue Demonstration

MAINE WING FLYERS staged an evacuation demonstration recently to prove that no area was too inaccessible for a determined evacuation and rescue team when they air-lifted four people from a clearing near Aziscoos Lake. This region, on the Maine-New Hampshire border, is wild and heavily wooded, and many of the communities are accessible by only one road. Residents of the area have often expressed concern that their only avenue of escape or assistance might be cut off in the event of a forest fire. It was this concern that prompted the CAP airmen to undertake the practice demonstration.

Wing Assists Navy

CALIFORNIA WING'S Stockton Squadron came to the aid of the Navy when they flew strafing runs over the Navy Supply Annex at Stockton during recent mock air raid exercises. Lt. George D. Russell, USN, acted as official Naval observer for the exercises, which were pronounced "highly satisfactory."

Canada Plays Host

THIRTY CADETS from North Dakota Wing's Fargo and Grand Forks Squadrons flew to Winnipeg, Canada, recently as guests of the Canadian Air Cadet League, marking the third year that the Canadians have exchanged visits with the North Dakota CAP group. Last year, the Canadians flew to Fargo to participate in that city's Silver Anniversary Diamond Jubilee. Prior to that, the North Dakota cadets took part in celebrating Winnipeg's 75th Anniversary.

The cadets were flown to Canada in a C-47 of the North Dakota Air National Guard. After taking part in the League's annual "field day" program, they were guests at a banquet and were taken on a sight-seeing tour of the city.

Ohio Building Campaign

MEMBERS OF THE SPRINGFIELD, O., Squadron are pushing steadily forward in their campaign to establish a $10,000 headquarters building at the Crabill Airport. A lot has been donated and there are promises of free electrical equipment, steel casement windows, landscaping and carpentry work. Latest benefactor was the Crowell-Collier Publishing Corporation which donated $500 to the growing fund.

Flyers Find Plane

TWO WYOMING CAP flyers have proved that determination really pays off. They are Lial Branson and Glenn Williams, of Casper, who found a wrecked Beechcraft four months after it had crashed. A reward of $5,000 for locating the lost plane was paid by the Wilshire Oil Company of California. The two airmen were among many who continued to search for the missing plane long after official searches had proved fruitless and were discontinued.

CAP Chaplains

LATEST STRENGTH FIGURES now list 235 chaplains in CAP's 52 Wings. California Wing tops the roster with 23 chaplains while Colorado is a close second with 19.

A group of cadets receives rifle instruction while at the CAP summer encampment at Stewart Air Force Base in New York. This year, 196 boys took part in the events.

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William Moyle
AOPA 8802
Nashville, Tennessee

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Faster Than Sound

(*Continued from page* 15)

such a design is not too effective. The wing and tail section is notched every three inches by small openings. This was done to obtain the load pressure at various speeds and altitudes.

To protect the pilot in the event of an emergency the nose section is so constructed that it will break off if a bail-out is imminent. The pilot comes off the nose, which is actually a protective capsule. When the capsule has slowed down sufficiently in free flight, the pilot pulls a release which allows him to fall backward out of the capsule.

The pilot, however, must judge when to pull the rip cord.

"This arrangement isn't too satisfactory," Bridgeman explained. "Engineers have come to the conclusion that this (the bail-out) is no time to ask the pilot to think rationally. There should be some device set up that would indicate just when a pilot should pull the release cord.

"I understand that the latest parachutes have a barometric release on them. This will help. As soon as you get down to a certain altitude, the chute will open of its own accord."

Another precaution taken to guarantee the safety of the supersonic pilot in case of an emergency are the fur-lined gloves that are now part of the "space" suit itself. The gloves are sewed to the suit's exterior.

If the supersonic pilot is forced to bail out, he is advised to put on the gloves as soon as possible. This will prevent his hands from freezing. The rarefied air rushing past the pilot's bare hands would cause a freezing condition that could easily result in the necessity for amputation, according to Air Force medical experts.

Bridgeman's famous June 11 flight—the announcement of which made headlines across the country—was conducted under the combined auspices of the Douglas Aircraft Company, the Navy Bureau of Aeronautics and the National Advisory Committee for Aeronautics. The chief purpose of the entire national sonic research program is pointed toward extending aeronautical knowledge in realms far beyond the speed of sound.

The sweptwinged *Skyrocket* that Bridgeman flew on his memorable flight first took to the air in early 1948 with combined jet and rocket engines. This permitted the craft to take-off and land as a conventional airplane. It pierced the sonic barrier on numerous occasions.

In November 1949, it was decided to extend the *Skyrocket's* speed researches beyond the program's original requirements. Authorization was then given the Douglas firm to continue the program by launching the exploratory craft from a mother ship.

Bridgeman made more than 60 flights in the *Skyrocket* when it was powered by the combined jet and rocket engines, and his June 11 run was his 10th in the 'Fish—his favorite name for the *Skyrocket*—under rocket power alone.

Like many other young men of today who are carving out successful careers in aviation, Bill Bridgeman's supersonic manner of living had its inception through and because of World War II.

William Barton Bridgeman was born in Ottumwa, Iowa, 34 years ago. He left the land of the tall corn at the age of two. His parents decided to forsake the hot summers and cold winters of the Hawkeye state for the more comfortable climes of South Pasadena, Calif.

Bill attended grade and high school in South Pasadena and then went two years to Pasadena Junior College. The Los Angeles Campus of the University of California was Bill's next academic stopping point. He attended this college as a geology major for three years. He played on the water polo team ("this is how I lost my hair," he explains), but took no part in any other form of athletic endeavor. At UCLA he obtained a sound background in higher mathematics, which has been invaluable in his supersonic test flying.

In 1940, when the pilot-training program beckoned so many young men from the classroom, Bill joined the Navy as a flying cadet.

He earned his wings in time to be at Pearl Harbor on December 7, 1941. Fifteen members of his squadron were killed in the Japanese raid on that infamous Sunday morning.

Through the succeeding years of the war, he flew a PB4Y (B-24) in low level strikes across the island chain in the South and Central Pacific. The worst scare of his flying career to date came when his squadron took part in a low level "softening up" attack on Iwo Jima just prior to the bloody invasion of that island by the Marines.

"We came in at night, flying at 200 feet and below," Bill recalled. "The Japs knew an invasion was imminent. They were set for us. From all sides they threw up anti-aircraft fire, tracer bullets and what not. It looked like the Fourth of July in the Los Angeles Coliseum. My ship was perforated with holes from nose to tail. How I got back to base is the top miracle—and top scare—of my life."

For his outstanding performances in the war, Bridgeman was awarded the Distinguished Flying Cross with cluster, the Air Medal with two clusters, and the Purple Heart.

Bill left the Navy in 1947, flew commercially in Hawaii and on the West Coast, and joined Douglas three years ago.

He has tested the *Skyraider*, an attack bomber, and the *Skynight*, a twin-engined jet night fighter, in addition to playing such a key part in Project D-558-2, the *Skyrocket* supersonic research program.

Bridgeman's entry into the field of supersonic test flying came about through his good friend, Gene May, a veteran Douglas Aircraft test pilot himself. May flew the *Skyrocket* before Bridgeman made his mark in the now-famous craft.

"Gene assured me that supersonic flying was a safe as well as a going proposition, and infinitely more interesting than flying passengers back and forth between Los Angeles and San Francisco," Bill said.

"So I decided to give it a try and accepted the Douglas offer. And I truly believe it is safer 'upstairs' than it is on Wilshire boulevard during the morning and evening rush hours."

Bridgeman has no illusions about keeping the "world's fastest human" title for very long.

Who can say for certain just how limited or unlimited are the horizons? He may break his own record, or some other test pilot may come along any time and do the same thing. As long as the men of science can build durable aircraft, capable of flying well beyond the sonic barrier, and as long as science can devise pressurized cabins and other equipment, there is no immediate end to altitude and speed accomplishments.

And we can be sure that our aeronautical engineers will continue to provide the tools for still greater achievements. END

"And There I Was . . ."

We were in a 12-plane step-down formation, when my radio gunner decided to play games. He refused to answer on the intercom. Flying a war-wear SBD, I was in no mood for jokes while making a rendezvous on my skipper's wing.

The planes were breaking formation when I noticed the skipper looking at my ship, his eyeballs dribbling onto my wing. He tried to get through to me on the low-frequency set until he finally gave vent to wild gestures aimed at my tail.

I tried my gunner again to find out what was wrong in back. Still no answer. In disgust, I detached my safety belt to get a look through the slit in the armor.

I just about blew my top when I saw his grinning face and, to top it all, he threw me a flip salute. But something was wrong—he shouldn't be facing me. . . .

This couldn't be—he was outside of the plane, riding astraddle on the turtle back. I couldn't believe my eyes. I was in too deep a state of shock to order him to parachute, but he thought of it himself and bailed out as we got back over the field.

Hours later, we got the story pieced together. As I had pushed over for the dive from 12,500 feet, his safety-belt retaining pin came out. Since he was facing the rear in dive position, he just turned over, floating right out of the cockpit. He had the presence, however, to switch hands on the gun track. He had ridden the tail in this manner for 11,000 feet in a near vertical dive bombing run, bailed out and landed in a pig sty by the field. He was cheery and happy, taking the next flight with me. Me? It took several days for my heart beats to get back to normal synchronization.

—Harry I. Clark, Jr.

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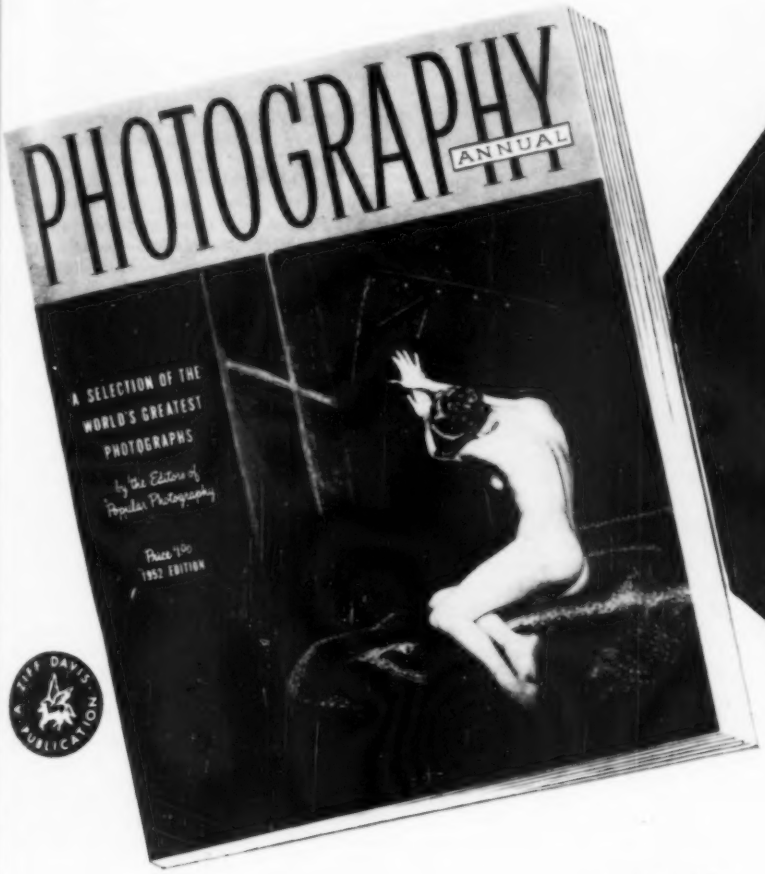

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Flying Peons

(Continued from page 17)

about an international incident. They were assigned to flights led by officers. Mayhew, Sallade and Pennel recently were returned to the Marine Corps Air Station at El Toro, Calif., to help form the Corps' first jet night fighter squadron, using the Douglas *Skynight*. The fourth member, Keegan, was killed overseas.

The "flying peons" have flown everything from helicopters and the light unarmed observation planes to the four-engined DC-4s. The transports kept a continual supply of men and priority goods flowing from Marine and Naval bases on the West Coast to Japanese stations and front line positions in Korea.

In the case of the transport pilot, it isn't at all unusual to find a master or technical sergeant outranking a captain or lieutenant colonel. Because of their greater experience, the "peons" are senior pilots and the officers serve as co-pilots. Hence, during the flight the non-commissioned man has full command over the officer.

Last winter, one of these transport pilots, T/Sgt. Wallace W. Mikelson, found out what a "race with death" meant. The Marines were fighting their way back from the Chang-jin Reservoir where they had been encircled by the Chinese Reds.

The sergeant, flying an R4D transport, had landed on a primitive, ice-glazed strip near Hagaru-Ri. He had finished carrying his full quota of wounded infantrymen aboard, when a Navy medical corpsman asked if he had room for one more.

A Marine had been hit in the chest. The pilot took the chance on the extra load when the corpsman explained that the Marine would die if he was not taken to an operating table.

After the wounded man was put on the plane with the others, the race against time began. The pilot took off with his overloaded ship, safely clearing the icy runway. Thirty minutes later he had landed at Yanpo, where an emergency hospital had been established.

There was a time when enlisted pilots were not permitted to fly passengers. Yet, the first Marine pilot ever to fly the DC-4, largest ship used by Leatherneck air units, was M/Sgt. Don Taft. A former stunt pilot, he gave up professional barnstorming to become a career Marine.

There were five master sergeants in the Marine's first jet squadron to go into combat. With no field experience, the group had to develop its own operational procedures and planning, drawing from experiences of the previous day. Their success is best measured by the fact that with only half of the planes operational, the squadron flew 650 combat missions in four months. The men with chevrons were credited with a sizeable part in this success.

This same group formed a club known as LEMACS. The exclusive organization is made up entirely of enlisted pilots who have destroyed at least one of the supply camels used by Chinese Communist forces. The letters stand for Lame, Emaciated, Miserable Asiatic Camels.

M/Sgt. Herb Valentine, a Navy Cross winner, was a fighter pilot in World War II, rising to the rank of captain. Following the war, when budgetary slashes for the military peeled the size of the Corps, he stayed on in enlisted status and joined an observation squadron. Tales of his feats in the Korean war have become barracks gossip on both sides of the Pacific.

In the early stages of the war, Valentine literally "saved the bacon" of a large Marine patrol which was scouting an advance along the Naktong River. He flew ahead of the patrol, following their route from the jump-off point. He reconnoitered two camouflaged Red tanks which would have the line of Marines on target when they appeared. He flew back to the head of the column and gave warning. A pair of Marine tanks were sent to the scene, mousetrapped the Reds and destroyed them.

The former fighter pilot, who shot down six Japanese planes during his 30 months in the Pacific, was twice rewarded: First, an official commendation—second, the promise of a beer by the entire Marine regiment.

Valentine, on another occasion, was flying this "glorified kite," as he called his light ship. He spotted a Korean Red regiment preparing to make a withdrawal ahead of hard-hitting United Nations forces. He saw the regimental command post packing up and moving out. He called for an air strike by fighter planes. While waiting for them, Valentine flew over the retreating Reds and fired at them with his .38 pistol and dropped hand grenades.

This particular experience led Valentine to comment that "there's nothing as frustrating as flying observation."

In addition to spotting enemy emplacements for artillery units, another of his self-appointed duties was to fly at brush-top-level over enemy-held territory. By drawing the Reds' small arms fire, he was able to expose positions and bring down mortar barrages.

As curious an assortment of flying sergeants as only the Marine Corps could throw together flew carrier missions off the USS Bataan, a light carrier. The six men who flew against Red forces were T/Sgt. Gail Lane, M/Sgt. John McMasters, and M/Sgt. Greene, mentioned before, all of Santa Ana, Calif.; two more Californians, M/Sgt. Donald A. Ives of Newport Beach, M/Sgt. Clyde B. Casebeer of Orange, and M/Sgt. Norman Payne of Houston, Texas.

This sextet flew mission after mission into the North Korean hinterlands and were credited with adding materially to the welfare of Marine ground forces by furnishing close air cover during the "advance of the rear" from the Chang-jin Reservoir.

Payne, flying a mission with three captains, was responsible for developing a new method of "tunnel smashing." He spotted a railroad tunnel and noticed that smoke was coming from both ends, a sure sign that the Reds were hiding a locomotive inside. Peeling off, he dived at the tunnel, leveling off to send high velocity rockets screaming into the entrance. The other tunnel-busters did the same from the opposite end. The explosion from within brought a goodly portion of the mountain tumbling down and the tunnel collapsed.

Casebeer, flying with Capt. Bert Perkins of Los Angeles, helped establish some sort of record. During a three hour flight, the pair bagged a locomotive, eleven rail cars, three trucks, five supply warehouses and a body of troops. In addition, they sealed another railway tunnel

"Calling tower . . . calling tower . . . did you give me the right runway?"

to cut off a supply route.

Before turning to *Corsairs*, Greene and Payne were transport pilots. Ives was the first enlisted Leatherneck to qualify as a jet fighter pilot. Casebeer served with the famed Marine Raiders during World War II, later being assigned to flight school.

With a background of four years in a "walking war," his comment meant something when he looked down from his cockpit at the troops straggling down the snow-covered mountain road to Hungnam.

"I'd sure hate to be down there fighting in all that snow and slush!"

T/Sgt. George J. Welker displayed a peculiar tenacity for staying in the war after his plane was shot down and he escaped without injury near Hagaru. Picked up by a helicopter, he was taken to a nearby airfield. There he found a transport loading wounded for evacuation. By lending a hand with the loading, he earned a flight back to his home base. The next day, he was flying another mission.

☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆

"Complete independence of Canadian aircraft industries within the next 25 years from all outside aid was announced by the Aviation League of Canada at a meeting in Ottawa recently." Popular Aviation, 1928.

* * *

"Are you a woman, and do you want to learn to fly? . . . Then my advice is—fly! From conversations I have had with women I have come to the conclusion that flying, to them, is more symbolical than to men. To many men it is merely mechanical; to women it seems to signify rising above their environment." Margery Brown, Popular Aviation, 1928.

☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆ ☆

T/Sgt. Charles L. Radford's "first accident in 120 carrier landings" during Korean operations was probably the luckiest one of his life. With Capt. Irving J. Barney, he had bombed Chinese Communist positions in the North Central sector. They were returning to their land base near Hungnam, when they ran into snow clouds that completely blocked their route. Without a radio range to fly and 8000-foot peaks all around, the pair headed for sea. Radford had two "hung" rockets and his gyro equipment had gone out during the flight. His gasoline supply was nearly gone.

They spotted the carrier, USS Sicily, over the Sea of Japan. As they circled, plane crews cleared the flight decks and ordered them to land. Radford made his approach with his gas meter on "empty"—and had to be waved off. His wingman, though, was allowed to land.

On the second try, the enlisted pilot's engine coughed and died. His landing hook caught on the last of the wires on the carrier deck and his prop nicked the end of the landing barrier. Out of the cockpit, the sergeant began to gripe about "120 carrier landings and my first accident has to be because I ran out of gas!" END

Off to a Good Start!

Headed for interesting jobs under the Airman Career Program are Private Karl O. Engstrom, pictured at left above, from Willmar, Minn., and Private First Class Bob Jones, right, from Yakima, Washington. Recently enlisted, both men's aptitudes and interests showed that they would make good weather observers. Now they are getting the chance.

Sergeant Henry B. Wuenbold, Jr. from Cincinnati, Ohio, is instructing Karl and Bob on use of the Theodolite in tracking hydrogen balloons to determine wind speed and direction at various altitudes.

When Karl and Bob finish training, under instructors like Sgt. Wuenbold, they'll be grounded in the fundamentals of a vital, interesting job with the Air Force.

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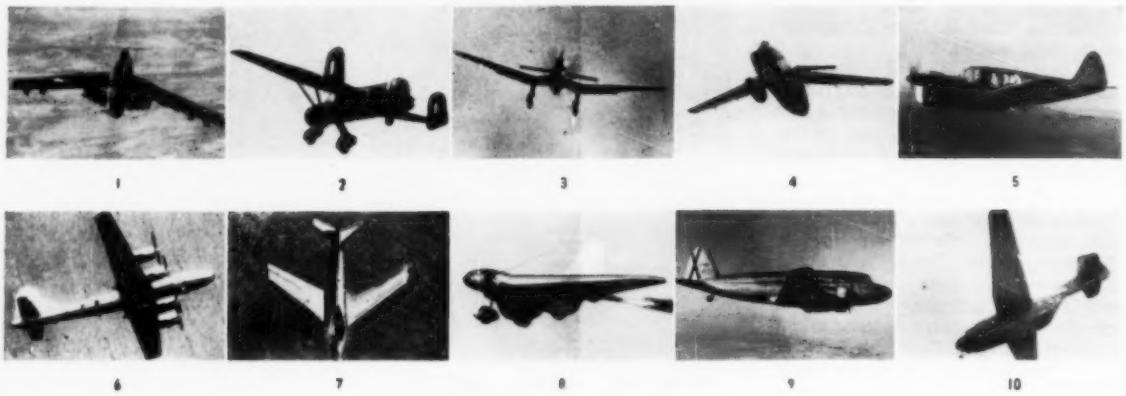

(1) Republic P-84F Thunderjet (U.S.A.). (2) Lysander Defiance Trailplane (Great Britain). (3) Junkers Ju87 (Germany). (4) Mitsubishi A6M-5 (Japan). (5) Nord 1203 Norecrin II (France). (6) YT-34 Hornbey (Russia). (7) North American F86A Sabre (U.S.A.). (8) Northrop Rocket Wing MX-324 (U.S.A.). (9) CASA-201 Alcotan (Spain). (10) Technical Service Command XCG-10 (U.S.A.).

The Mail Box

(Continued from page 6)

NOT ENOUGH CLUBS?

As road manager for a concert group, I have travelled widely throughout the United States, visiting more than 250 cities since arriving in this country five years ago from France. I have been a pilot since 1912 and am still flying. During my trips I have been amazed at the lack of aviation clubs in the States.

There are many persons who are aviation-minded and would like to participate in flying but who, for lack of facilities, do not know how to make the proper contacts with others having the same interests.

With well-tested rules and regulations and under the guidance of experienced persons, such clubs would enable those who like aviation to learn to fly a plane, and economically, too, since club dues might be half of commercial costs. People would thus be able to fly a plane and use it in the same manner as they now use automobiles.

Publication of club periodicals, organization of dances and other recreation could help these clubs financially. I imagine the inclusion of a program of parachute jumping, contests for flying models, navigation courses, photography and the study of radio and aviation mechanics would attract even more people.

To sum up: Why are there so few community aviation clubs in the United States and why not create more?

MAX HARTMAN

New York, N. Y.

● *There are a good many flying clubs in the United States, but not, proportionately, as many as there are in Europe. Main reasons, we believe, are that planes and instructional costs are cheaper here, and pilots on the average have more money. Also, could it be that would-be pilots who don't have enough cash don't want to fly badly enough?*—ED.

ALTITUDE FOR SAFETY

I feel remiss in having delayed so long in making a comment on "I Learned About Flying From That," by Bernard K. Allen (FLYING April). Shortly after the story appeared, a fatal accident took place in the same area (Tehachapi Mountains between Bakersfield and Palmdale, Calif.), involving a California pilot and three passengers. The cause of this tragedy motivated my determination to add another vital point to Mr. Allen's article.

I have traveled this route in my Cessna 140 many times in all possible directions. I believe that in a flight at proper altitude, the mountain passes, from San Bernardino-Gorgonio through San Antonio to Mt. Wilson and the Sierras on the North, stand out so unmistakably that a 10-year old boy with a grade-school geography map would have no excuse for getting fouled up. On the other hand, at 500 feet over terrain the picture could be quite different and it would be entirely possible for even a fairly experienced pilot with excellent charts to get in trouble.

In order to have experienced the situation reported in his story, Mr. Allen must have undertaken to cross somewhere around the 500-foot altitude and that is no altitude at which to cross such an area if you value your skin, or your ship.

This region is notorious for vicious down drafts. On one occasion, unusual I admit, I was forced down a full 4,000 feet in spite of everything I could do with my 95 h.p. Continental engine. You can bet I was indulging no feelings of complaisancy during that operation, but I was darned thankful that I had the prudence to enter the area at well over the 9,000 feet indicated on my altimeter.

That then is the point Bernard Allen seems to have overlooked, but one which no pilot undertaking to traverse this area should miss.

ROBERT MACK LIGHT

San Bernardino, Calif.

TARGET PASSES

While paging through my August copy of FLYING, what should I see but Clarence Mueller making a pass at a flagtype target with an AT-6, which is fine and dandy.

Now, I've made a few passes on one of those things myself with the AT-6, but the target was always right side up, I'm sure.

BLAINE NASH

Spearfish, S. D.

● *Look again, Mr. Nash. The picture, a USAF photo, might have been taken from a different angle than you are used to but it is definitely at the correct angle for passes.*—ED.

AQUA II SPARKS INTEREST

We are interested in the Aqua II as shown on page 33 of the August issue of FLYING. Will you please advise whom we should contact with regard to the availability of this plane?

JOHN L. SMITH

Orange, Texas

In reference to the Aqua II, please advise the address of the manufacturer.

J. E. POTTHARST, JR.

New Orleans, La.

● *This new amphibian has apparently caught the fancy of many readers. As of this writing the plane has not yet begun CAA certification tests. The designer, Meredith C. Wardle, can be reached care of Aquaflight, Inc., 1601 Harrison Ave., Wilmington, Del., for those of you who wish to follow its progress.*—ED.

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Floatplane Hazards

(*Continued from page* 42)

There is a modification of the anchorage system which works well during a storm, especially if you stay right by or in the airplane. When a strong wind is blowing you can tie a line to shore and let the airplane out on a line as far as you like. This is of course done from the upwind shore so that the plane is held away from shore by the wind. In this manner the airplane will be in the most sheltered spot, for the waves are always small along the upwind shore. Two lines should always be used, unless you are staying in the airplane.

There is a danger not readily apparent to an aircraft safely anchored on water, if there comes an unexpected snowstorm. During the heavy snow the weight of the airplane will in time cause it to sink. The weight of the snow on the tail will push the tails of the floats lower and lower under water. They will fill slowly with water through the air vents and eventually the airplane will sink tail first. It takes a heavy snow to do this trick under certain conditions. Yet an eight-inch wet snow in early fall, when the camper has perhaps left his airplane for a few days to take a trip on foot, could be disastrous. In the fall of the year an eight-inch wet snow can fall any night.

A safe anchorage on a buoy is the easiest way to secure a float ship but generally such an anchorage isn't at hand. When the wind begins to moan and the breakers crash down upon the beach with an angry roar, there is only one sure way the floatplane pilot, caught in an exposed position, can make his airplane safe. An airplane equipped with floats is the easiest of all aircraft to make secure, and when the job is finished that plane is anchored there to stay. Ski planes and wheel ships can be tied fairly securely and their tails propped up, but a floatplane can be literally anchored to the earth, and here is how you do it.

The first step is to move the airplane to a spot where a gradual sloping beach permits you to work it up upon land. This should always be done on the upwind shore unless you can make the plane safe from waves in some other manner. The waves will crash against the downwind shore, and as the storm mounts you may find yourself in the breakers. A light plane such as a Cessna 140 can be worked up on the beach by one man.

The procedure is to lift on a main wing strut where it is attached to the wing. You can move the ship a few inches each time, and by lifting first one side and then the other you gradually get it up on the beach. If there is more than one person about, a few others helping can do it easily. If the airplane is too heavy to move you can run it up in very shallow water out of the danger of waves. Here the airplane is faced exactly into the wind with the tail propped up by some means a little higher than normal flight attitude. This is often accomplished by digging from under the floats or by blocking up under them with logs or trash.

The next step is to make the tie-downs. Secure tie-downs are rarely found where you want them, so be prepared to make your own. A tie-down that will hold a light airplane is made by digging a trench about 24 inches deep and four feet long. Tie your rope securely to a piece of wood, a long flat rock or even to your canoe paddle. A canoe paddle is a must for all float ships and is carried along attached to the inside of a float. Bury the toggle in the bottom of the hole and tramp the hole full of sand or earth. A modification of this principle is to pile rocks upon the toggle, but the buried toggle is the strongest and best.

This is done at the outer end of each wing a few feet ahead of the leading edge. During this operation I have sometimes had a hole punched in the underside of a wing by the end of a shovel handle wielded by an overly-enthusiastic Eskimo who was helping me. Keep in mind that anyone can punch a hole as easily as an Eskimo. The ropes are now secured to the regular tie-down rings on the airplane and a final toggle is buried to hold the tail. You can tie the controls if you like, but there is little danger of them moving when the airplane faces exactly into the wind.

This method of tying will weather almost any storm, but there comes the infrequent gale when the sand drives like hail, the short prairie grass lays to the ground and the tent blows over. The sea no longer is a mass of white caps but turns to boiling foam and a wind of hurricane force sweeps over all. Here the landplane pilot clings to his trembling ship while every blast sends a shudder over its frame. A rope snaps or a tie-down gives way, and mutilated remains are all that is left of a once-proud aircraft. Upon two occasions as the tent went down I have leaped, bucket in hand, barefoot and scantily clad, to the side of the stricken *Arctic Tern* while an arctic gale raced toward the 80 m.p.h. mark.

Here the floatplane pilot takes off the inspection plates of the floats and pours the floats full of water!

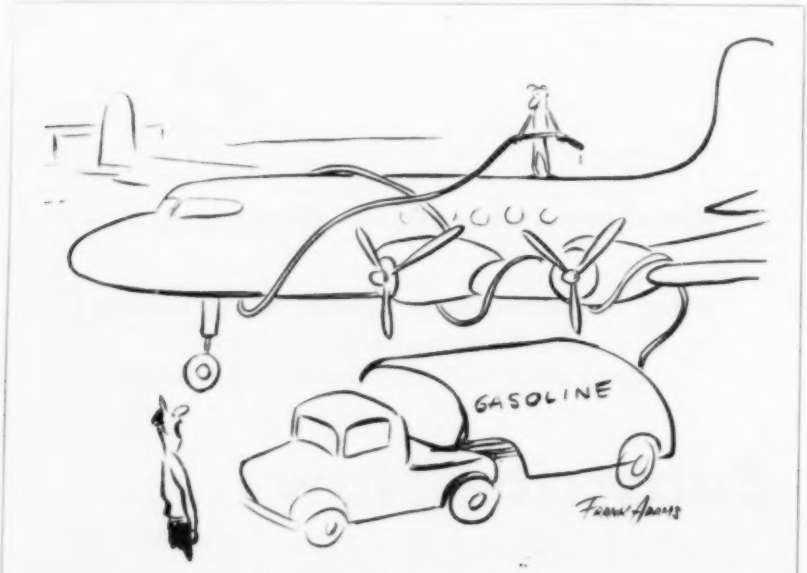
Sand would do, but water is easier to get out later, and water is always sure to be available where a float ship is. A two-place airplane can have its weight increased by more than a TON—and right at the ground level where it will do the most good. Thus, with a ton overload, tied securely, and facing into the wind, the airplane will not move, even in a tornado. The pilot can also climb into the plane to add his own weight, and this I have also done. Thus the storm wears itself out and moves on.

In the arctic such a storm can blow for a week, and we have kept watch over our airplane for five days at a time while it raged. When the storm passes, an undamaged airplane, ready to go exploring again, more than repays the floatplane pilot for the extra work of bailing out the floats. END

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

"In earlier times many thoughtful men have given unqualified recognition to the uses and delights of the imagination. But could they see now in the light of history, with what folly human nature has pushed a noble truth to the extreme, they would realize that much of its wisdom and grandeur has been obscured by the abuse of the imagination and undue revelling in its pleasures . . . The successful flying machine, to spring full-fledged from the ashes of present failure, would have to be a Phoenix." Rear Admiral George W. Melville, Engineer-in-Chief, USN, North American Review, 1901.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★



"Did you try the other wing?"

Bill Renshaw
State Fairgrounds
Indianapolis 5, Ind.

VIA AIR MAIL

Flying Farmers, U.S.A.

SOIL CONSERVATION AIRLIFTS

Many progressive Midwestern bankers, aware that good soil conservation practices and agricultural prosperity go hand in hand, are helping promote Soil Conservation Airlifts. First banker to use the light airplane to promote soil and water conservation was Fred O'Hair, President of the Central National Bank of Greencastle, Ind. Back in 1946, O'Hair, at the suggestion of this columnist, gave more than 600 farmers a bird's-eye view of good and bad farming practices, as well as a chance to view their own acres. Picking up the check for all the rides, O'Hair remarked that it was one of the best investments he had ever made.

Most recent event of this nature was sponsored by the Security Bank and Trust Company and the American National Bank of Vincennes, Ind. In one day twelve airplanes flying from the O'Neal Airport hauled 260 farmers and members of their families. Total cost to the banks was $400.00, with each passenger chipping in $1.00 for his ride. Farmers were shown both good and poor soil conservation practices, after which they were taken for an extended ride over their farms. For most, it was their first flight.

This column is convinced that this is one of the soundest uses to which the light plane can be put. It can be done almost anywhere by getting the cooperation of Flying Farmers, the Agricultural Extension Service, the Soil Conservation Service, the local airport and interested bankers or other business organizations anxious to promote agricultural good will, while encouraging soil and water conservation at the same time.

★ ★ ★

WIVES CAN GET FLYING FEVER

What is the formula used by Midwestern Flying Farmers to get their women folks interested in flying? We've been asked that question ever since word got around that farm women flock to many airports in both Indiana and Illinois. Actually the formula is as old as the hills. Briefly stated, it is "Take them into all the activities."

In Madison County, Indiana, for instance, the flying farmers and the three operators have a social program twelve months in the year. The ladies are given important assignments and they love them. As many as possible of the events are held at the airports, where there is always good food, clean rest rooms and genuine hospitality. In fact, if mother needs a baby sitter while she goes flying, there is one handy too, as are swings, sand piles and teeter-totters.

The one activity in Madison County that isn't held at the airport is the Annual Flying Farmer Fish Fry. Last year it drew 1500 people. It is so big that the local Armory is leased for the night.

Theory of Midwestern Flying Farmers is if you take the little woman flying with you she isn't nearly so apt to "fly off the handle" when the aviation bills come in.

★ ★ ★

SMALL AIRPORT REVENUE SOLUTION

The Highland-Winet Airpark, Highland, Ill., will not be going back into corn or soybeans in the foreseeable future. Noting that many small town airports were having trouble keeping their heads above the water when they depended solely on aviation activities, Omer J. Luber decided it would be smart to have several other sources of income from the airport land. Started in 1945, the airport is today almost a little city within itself. The airport motel has 15 units. There is a splendid airport garage and service station. The airport restaurant is an up and going concern. Then there is the airport drive-in-theatre, with a family rate that shows a nice profit six months out of the year. After land is taken out for all these activities there is still room for three good sod runways and forty acres for farm crops. Pilots flying across the nation via the St. Louis-Indianapolis route have found Highland a good place to stop over night. Extra attraction is the nearby country club, available for a modest fee.

★ ★ ★

FUNDS RAISED FOR AIRMARKING

When the recent General Assembly in Indiana left the airmarking program hanging "high and dry," private pilots sparked a fund raising campaign to finish the job. Flying Farmers pledged $1,000 by year's end. In first month, this organization reached the half-way mark, leading Aeronautic Commission officials to predict that the job will be finished on a voluntary basis.

Several years ago the Indiana Legislature enacted a law requiring all towns of 500 population or more to be airmarked. They did not however provide the wherewithal. Years later lawmakers got around to appropriating $5,000 per year for the biennial. With this $10,000, the job was about half-finished.

A member of the legislature, who is a private pilot was credited with killing an appropriation that would have finished the job. He declared on the floor of the House that airmarking isn't necessary. Funds now being raised by subscription will be turned over to the Aeronautics Commission under a new law which allows it to accept grants and gifts.

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Check List Complex

(Continued from page 29)

accidents—minor or serious—which have plagued it in the past, those of us who fly for fun might do well to copy some of the techniques which have helped the airlines and the military achieve safety. The check list is no panacea. It is but one facet of a safety formula. But it represents a good starting place. Here is how you might go about using a check list in your own flying program.

I have contacted most of the manufacturers of lightplanes. A majority of these inform me that check lists are available for the type airplane they produce. These may be procured by writing to the manufacturer. In some instances, a small fee is charged for the check list. Others are free. Be prepared to pay this nominal sum, where required. It will be an excellent investment.

In the meantime, here is a check list which can be used for any airplane. I am concentrating on the pre-take-off and pre-landing periods for accident records prove these to be the most critical moments of flying. Don't trust your memory. Print the following underlined items on a piece of cardboard and carry this list in the airplane at all times.

CONTROLS. Make sure that the controls are free-working and properly rigged. Many lightplane owners do not use control locks. But I need not remind you of the tragic accidents which have been traced to locked controls. It is good insurance to form the habit of checking this item before each take-off.

By properly rigged, I mean that the controls should move correspondingly as pressure is applied on the rudders and stick. Push the stick or wheel hard forward. At the same time, apply full left aileron and left rudder. Then *look* at the controls. Be certain that they are in the proper position.

Now pull the stick or wheel back to its limit. Apply full right rudder and aileron. *Look* again. Open the canopy or hood, if necessary. Stand up if you cannot see the controls.

INSTRUMENTS AND SWITCHES. Depending upon the type of airplane you are flying, you will have any number of these. It is unnecessary here to remind you that you should be thoroughly familiar with the location and function of each one. Flying, as a basic exercise, is the same, regardless of airplane make. But special equipment and the instruments and switches related to this equipment vary.

Usually, switches and instruments may be checked just prior to take-off. Form the habit of following a set routine. Start from top left and work across the panel to the right. Don't guess or be superficial about this. If anything is wrong, you are the one who wants to know about it before leaving the ground. Better yet, if something is amiss, don't take-off. Go back to the hangar and eliminate the trouble.

In some cases, it will be necessary to check a few instruments while taxiing. I refer to some of the gyro-controlled equipment. Their proper functioning must be tested while making a few turns on the ground.

And don't forget the radio. For purposes of pre-take-off testing, the radio should be considered as an instrument.

GAS. This check, of course, must be definitely related to the type airplane you are flying. Whatever the peculiarities of your particular fuel system, determine that all is well before bending the throttle.

On many lightplanes, the carburetor heat control is wired shut. Strange as it may seem, a friend of mine got to jiggling with such a safety one day. Without realizing it, he must have broken the wire. And the heat control "sneaked" open. Friend flyer couldn't understand what happened to his power on take-off. Luckily, he discovered the trouble in time.

Behind the "Six" Ball

IN WORLD WAR II, at the end of primary flight training, all Army Cadets took a short cross-country flight. Cadet Russell Grove, who later flew B-25's in Italy, became lost on his trip of less than 50 miles.

The primary school at Twenty-nine Palms in the California desert sent out flight commanders and instructors in search of the missing pilot. It was without success.

Long after his gasoline supply should have been exhausted, Cadet Grove landed on the home field. The commanding officer summoned him for an explanation.

Cadet Grove had indeed become lost and had landed on a pint-sized Tank Corps field in Arizona. He refueled, asked the way to the training field and took off for home.

"But why did you get lost in the first place?" demanded the C.O.

"Well," he explained, "the compass heading on the first leg was six degrees. So I flew the big six on the magnetic compass."

His only error was that he was just 54° off course, since the big six means 60°!

—Don Downie

If your airplane has a cockpit fuel amount indicator, make sure it isn't stuck. Tap it lightly with your finger. Check fuel pressure if this gauge is part of your equipment. To repeat, make a complete and careful analysis of all gasoline gauges, cocks, etc., before starting the take-off.

FLAPS. If your airplane is not provided with flaps, you may be tempted to leave this item off your check list. Don't! Some day, you may be using an airplane with flaps. Form complete safety habits now and they will save you a lot of worry.

Whether manual, electric or hydraulic, run the flaps through their full cycle of movement. And again, *look* at the flaps as well as the indicator. Be sure that they are in the desired position for take-off.

TRIM. Your airplane may have but one trim tab, or it may have a trim tab for each axis. Whatever the case, see that the trim tabs are set for take-off.

Misfortunes can result from improperly trimmed rudder or ailerons. Torque can be mighty hard to handle without a little boost from the rudder tab. And a wrong twist on the aileron control could conceivably throw the ship into a roll at some inconveniently low altitude.

PROPELLER. Use this reminder to make sure that the propeller control is set for high r.p.m. Many a farmer's fence bears the scars of some poor airplane which couldn't get off the ground because a pilot forgot this important item.

RUN-UP. This is not a magneto check. It is to clear the engine and check take-off r.p.m. just before starting the take-off roll. While going through the preliminary steps of the pre-take-off check, it is possible that the engine might load up. This last-minute run-up will give the pilot a final test of engine efficiency and minimize the possibility of a cut-out during take-off.

In addition to the above, a check list for landing is given below. This will take care of the most important items. Again, however, individual airplane equipment must be considered.

GAS. This should include a check of all fuel system equipment listed in the pre-take-off procedure.

UNDER-CARRIAGE. Determine that the wheels are down and properly locked. Don't take a chance on "maybe so." If visible from the cockpit, look at the wheels. Check the visual indicators. If your airplane has a warning horn, retard the throttle before lowering the gear and listen for the horn to sound. Let us hope that you never have the "ear trouble" which once characterized a student of mine.

Turning on the final approach, this lad had forgotten to lower his gear. As we settled toward the earth, he throttled back. And the warning horn began to blow. We were getting down to critical altitude when I said:

"Don't you think you'd better put down your wheels?"

The student looked at me, a puzzled expression on his face. All the while, the horn was blasting away.

"I'm sorry," he said, "but that horn is making so much noise I can't hear what you're saying."

Another word of warning might be inserted here. This concerns lowering the wheels manually in case of mechanical failure. If you have occasion to lower the wheels manually follow the check list admonition: "Down and locked."

One final check is in order for the wheels. After lowering the gear, retard the throttle once more. This time the horn should be silent.

MIXTURE. Set the mixture control for full rich. A lean mixture can cause a serious reduction of power in case of a go-around procedure.

PROPELLER. Increase the r.p.m. to high or best setting for your airplane in the event it becomes necessary to go around. Best time to do this is on the downwind leg. After that the pilot may concentrate on flying the pattern and other pre-landing requirements.

By following these established take-off and landing checks, you will minimize the possibility of oversights and accidents. In time, you may wish to expand the use of a check list to cover the entire cycle of airplane procedure—from the time you approach the ship until you leave it. END

It's Rugged But Right

(*Continued from page 21*)

your approach for runway 34.
3. Upon approaching Salt Lake City for a landing into the south on the north-south runway, you observe a flashing amber light on the control tower. The approximate heading of your airplane on the base leg of your final approach should be east.
4. While taxiing out for take-off, you receive a steady red light. You should give way to overtaking aircraft and continue to taxi.
5. The airplane at the lowest altitude always has landing right-of-way.
6. When you rent an airplane which you intend to fly, you should check to see that it has received a periodic inspection within the last 10 hours of flying time.
7. Airville has both an airport traffic control tower and an airway communications station. If you wish to file a flight plan from the air, you should contact the control tower.
8. An airworthiness certificate, in order to be valid, must have been issued within the preceding 6 months.
9. If you are in level crusing flight outside of control zones and control areas, you are required to fly at an altitude appropriate to the magnetic course being flown as follows: (1) 0°-89°, at odd thousands (3,000; 5,000; etc.) (2) 90°-179°, at odd thousands plus 500 (3,500; 5,500; etc.); (3) 180°-269°, at even thousands (4,000; 6,000; etc.); (4) 270°-359°, at even thousands plus 500 (4,500; 6,500; etc.).
10. Except during take-off or landing, the minimum altitude a pilot may maintain over congested areas, cities, towns, etc., is 1,000 feet above the highest obstacle within a horizontal radius of 2,000 feet from the aircraft, and in any event an altitude which will permit, in case of engine failure, an emergency landing without undue hazard to persons or property on the surface.
11. If you wish to practice spins off airways and outside of control areas, your minimum permissible flight visibility is one mile.
12. If, while flying at night, you observe the red wing tip light on another airplane at your altitude, you should assume that you are on his right and, therefore, have the right-of-way.

Weather Recognition

13. In a light airplane you should always fly through a thunderstorm between 6,000 and 8,000 feet above the ground.
14. When dew point and temperature are close together, and the trend indicates they will soon be within 1° of each other, you should expect poor visibility.
15. Down drafts are likely to occur close to the downwind sides of mountain ranges.
16. Scattered small cumulus clouds against a blue sky are characteristic of storm areas.
17. Most wind reports now give the wind velocity in knots. A wind reported as 25 knots equals approximately 35 m.p.h.
18. You cannot continue flight into minimum VFR weather conditions with assurance that weather will remain VFR behind you to permit return in case the weather ahead drops to IFR conditions.
19. If while on a cross-country flight, you are advised of IFR conditions ahead, it would be wise to request a complete weather summary before revising your flight plan.
20. Low ceiling, poor visibility, and steady precipitation are characteristics of a warm front area.
21. You plan to make a cross-country flight tomorrow morning, and the forecaster tells you that a warm front will move into the area tonight about midnight. You may normally expect that the weather will be clear by mid-forenoon.
22. Vertical currents in mountainous areas are frequently so strong that the altitude of an aircraft cannot be controlled.
23. You are informed by the CAA communications station that there is a cold front between you and your destination, 100 miles away, with a temperature drop of 30°. In flying through such a front, you should expect the frontal turbulence to be mild.
24. When attempting to locate an airport in conditions of restricted visibility due to haze or smoke, it is wise to fly well to one side of its suspected location so as to see it between you and the sun.
25. You have been cruising on a heading of 035° with little or no wind, and because of weather you wish to return to your point of departure. Your approximate heading on the return flight will be 255°.
26. You correct for magnetic variation by adding westerly and subtracting easterly variation from the true course.
27. The four most important instruments for dead reckoning navigation are: time piece, altimeter, compass, and airspeed indicator.
28. Beneath an airport symbol on a sectional chart are the characters, "28 LH 40." From this you should know that the longest hard-surfaced runway is 2,800 feet.
29. Deviation always remains the same in each airplane.
30. At 1420 you identify your position as over a check point 70 miles short of your destination. You have established your ground speed at 120 m.p.h. You may expect to arrive at your destination at approximately 1510.
31. When departing an unfamiliar metropolitan area under minimum VFR visibility conditions, railroads are excellent landmarks.
32. If you are flying a compass heading of 015° and wish to take up a compass heading of 355°, you should turn to the left.
33. If you are flying an airplane which cruises 90 m.p.h. in a 30 mile per hour direct tail wind, it will take you at least twice as long to return as it took to reach the turning point.
34. Plane A and plane B fly over the same course under identical conditions, but plane B cruises twice as fast as plane A. Plane B will use only half as much drift correction as plane A.
35. The altimeter should always be set to zero before take-off on a cross-country flight.
36. The compass reading to use on a cross-country flight can be determined by trial and error by flying a direct line between two checks points on course, and observing the compass reading necessary to do so.

(*Continued on page 56*)

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37. If you have become lost while flying cross-country, your best procedure is to fly in an expanding circle, looking for a known landmark.

GENERAL OPERATION

(These questions apply to single-engines with less than 250 h.p. engines, unsupercharged.)

38. The chief reason for "clearing" or "gunning" the engine during a power-off glide is to keep from losing altitude too rapidly.

39. If you are operating at cruising speed and encounter very rough air, it is advisable to slow down in order to minimize structural stress and strain in the aircraft.

40. Your lightplane engine will develop more horsepower at 10,000 feet than at 2,000 feet of altitude.

41. If you cannot obtain fuel of the exact recommended octane rating, it is better to use one grade higher than recommended rather than to use a lower grade.

42. The distribution of the load in an airplane cannot bring the center of gravity beyond allowable limits so long as the authorized weight is not exceeded.

43. You are flying at a constant altitude without a change in throttle setting in an airplane with a fixed pitch propeller, and notice a gradual decrease in engine r.p.m. From this you know that your fuel supply is nearly exhausted.

44. If you have been cruising at 12,000 feet, and come down to cruise at 2,000 feet, you will need a leaner carburetor mixture at the lower altitude.

45. When checking magnetos on an engine equipped with a fixed pitch propeller, the maximum r.p.m. drop which is normally accepted is 100 r.p.m.'s.

46. The probability of encountering carburetor ice always increases as the temperature decreases.

47. If the switch is turned off, you may feel assured that the engine will not kick or start when the propeller is turned.

48. If you have a fire in the carburetor just after starting your engine, you should immediately close the throttle and turn off the switch.

49. While executing a normal climb on a hot day, you notice your oil temperature approaching the red line. Good procedure would be to lower the nose, thereby reducing the rate of climb and increasing the airspeed.

50. An abrupt pull-up at high speed will place excessive stress on an airplane's wings even though the plane is properly loaded.

ANSWERS

1. True.
2. True.
3. True.
4. False: You should stop and hold your position until you receive a further signal from the tower.
5. False: When two or more aircraft are approaching an airport for the purpose of landing, the aircraft at the lower altitude has the right-of-way, but it shall not take advantage of this rule to cut-in in front of another which is on final approach to land, or to overtake that aircraft.
6. True.
7. False: Your flight plan should be filed with the CAA communications station.
8. False: Airworthiness certificates must be renewed each year.
9. True.
10. True.
11. False: Three miles' visibility is required for acrobatic manuevers. Acrobatics may not be practiced on airways or in control zones regardless of the visibility.
12. False: The red wing tip light is on the left wing, and indicates that you are to the left of the airplane observed, and the other airplane has the right-of-way

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

So you think maybe you got troubles? At the Etosha Pan, Southwest Africa, a low-flying plane was attacked by a group of nine lions who had been feeding on a buck. The pilot had seen the kill from the air and flew over to take photographs. As he did a tight turn over them, one of the lions leaped into the air with extended paws, and took after the aircraft. As the plane receded, the beast sat on its haunches and snarled.

Ever wonder why the Caterpillar Club was chosen as the designation of the organization of people who have saved their lives by parachute? Well, it's because of the gentle descent of the caterpillar on its silken thread.

At Brooks Air Force Base, San Antonio, the NIP Club was formed. The club was created by a group of company grade officers who got kind of tired of all the fuss paid to VIPs very important people. Nips are Not Important people. Club bylaws stipulate that a member promoted to a rank as high as a major must "refuse the advancement or resign his membership."

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and you should alter your course so as to pass at a safe distance.

13. False: A lightplane should never be intentionally flown through a thunderstorm. The immediate vicinity of thunderstorms should be avoided due to the turbulence, hail, and violent vertical currents associated with them.
14. True.
15. True.
16. False: Small cumulus clouds against a clear sky are characteristic of fair summer days. However, these small cumulus clouds may develop into scattered local thunderstorms late on hot afternoons.
17. False: 25 knots equals approximately 29 m.p.h. It will be noted that in winds of less than 30 knots, the maximum in which lightplanes are usually operated, the difference in knots and m.p.h. may be disregarded for all practical purposes. To convert knots to m.p.h. quickly, add 15%.
18. True.
19. True.
20. True.
21. False: Warm front activity is normally characterized by low ceilings, poor visibility, and precipitation. These conditions normally cover wide areas, and may last for several dalys.
22. True.
23. False: A cold front of this nature will probably be accompanied with heavy precipitation, violent turbulence, and low visibility, and flight through such a front is extremely dangerous.
24. False. Visibility in haze and smoke conditions is greater when looking away from the sun, particularly in the morning and evening. Consequently you should fly so as to pass the suspected location on the side toward the sun.
25. False: The reciprocal of 035° is 215°.
26. True.
27. True.
28. False: 28 indicates that the airport is 28 feet above sea level; L that it has lights; and H 40 that it has at least one hard-surfaced runway 4,000 feet long.
29. False: Deviation is a compass error caused by metal parts of an airplane and by electrical equipment installed in an airplane. When these change, the deviation will change.
30. False: At 120 m.p.h. you will cover two miles each minute. Seventy miles will require 35 minutes. You should therefore arrive at 1455.
31. False: The large number of railroads in close proximity fanning out from a metropolitan area may prove confusing, and you might select the wrong one. It is better to fly some distance from the area on a pre-determined heading before using some railroad as a landmark.
32. True.
33. True.
34. True.
35. False: Unless the altimeter is set to the elevation of the airport of takeoff, it will give readings which have no significance over strange terrain, or at the airport of destination.
36. True.
37. False: It is considered good practice to hold a selected heading until some prominent landmark appears, rather than to circle or change course aimlessly.
38. False: The engine is cleared during glides to assure that it is ready for use when needed.
39. True.
40. False: An unsupercharged engine will gradually lose power as the altitude decreases.
41. True.
42. False: Serious unbalance may occur if the airplane is not loaded in accordance with the loading schedule which is included in the airplane flight manual, or attached to the operation limitations placard.
43. False: A gradually decreasing r.p.m. is a good indication of the formation of carburetor ice.
44. False: A richer mixture is necessary at lower altitudes due to the greater density of the air.
45. True.
46. False: Carburetor ice is extremely unlikely at very cold temperatures, below 20° F, or at very warm temperatures, above 80° F.
47. False: Any loose contact in the switch or its wiring will allow the engine to kick or start when the propeller is turned, regardless of the position of the switch.
48. False: A carburetor fire at the time of starting the engine can usually be extinguished by opening the throttle wide and allowing the engine to switch the fire into the intake.
49. True.
50. True.

Around the Clock

(*Continued from page 20*)

to them here which will make them a more highly proficient fighter team. After these flights they critique their operations and iron out the rough spots.

Finally, the time arrives for introduction to the F-94. For approximately three weeks the radar-observer and pilot become an inseparable pair. Taking off from the long runways at Tyndall through rain or sunshine, day or night, the team flies at all altitudes searching for their "enemy." The "enemy" may be another F-94 or any aircraft from Tyndall flying as the target plane.

This training is not being restricted to veteran radar-observers and pilots. Young graduates from the jet fighter school, Williams Air Force Base, Chandler, Ariz., and new radar-observers from a 50-week course at Keesler Air Force Base, are furthering their training in the Air Force.

The Air Force explains the purpose of this training for the following reasons: Should enemy bombers approach the shores of the United States, their presence would be spotted by GCI (Ground Control Intercept) or civil volunteer ground observers. Immediately the nearest Air Force interceptor base is alerted. Within a matter of minutes, the high speed all-weather fighters are airborne, and under the supervision of GCI, are directed to the oncoming bombers.

This combined radar of the continental radar network of the Air Defense Command and the all-weather fighters can be the defense force of intercepting and defeating the enemy. END

This photo of Capt. Jimmy Jabara, history's first jet ace, seated at the controls of a 1912 Curtiss model pusher-type airplane might be incongruous. But, it graphically tells the story of aviation's growth in the past 30 years. Captain Jabara took over as "aviator" on this 70-m.h.p. plane after completing his first flight in the Boeing Stratojet (visible in background) and attaining a speed of 600 m.p.h. Lieut. Col. Patrick D. Fleming, first pilot of the B-47, and Lieut. James R. Odom, co-pilot, wait their turn to find out how it feels to be slowed down 530 miles. Looking on is Civilian Billy Parker, owner of the Curtiss.

THE WEEMS LINE includes many navigation aids and instruments which are standard equipment with U. S. Air Forces, major air lines and foreign governments. Many are navigation "musts" for pilot and student alike, especially the Weems Mark II Aircraft Plotter, the Dalton E-6B, or Mark VII Computer. A few of them are described below. Many others are available.

WEEMS MARK II PLOTTER: Scale fits sectional and world air charts. Used for plotting bearings, courses, measuring distances, constructing wind diagrams and angles. Only $2.00.

DALTON E-6B COMPUTER: Two sides. One for solving all vector problems—wind, true heading, ground speed. Other side graduated for computing speed-time-distance, fuel consumption, air speed and altitude corrections, as well as statute-nautical mile conversions. Only $10.00 complete.

DALTON MARK VII COMPUTER: Vector side "mocks-up" track-drift-true heading triangle, allows simple, easily oriented setting-up and solution of all wind problems. Computer side for speed-time-distance, fuel consumption, air speed and altitude corrections, and statute nautical mile conversions, plus erasable air speed calibration chart and flight log. Only $5.00.

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Brandenfels

(*Continued from page* 34)

called. "We got into bad weather and nearly ran out of gas before we found a place to land."

Omni removes all that worry, except in bad weather flying over mountainous terrain. Brandenfels anticipated this contingency and relies on his Lear ADF, which he claims works better than military radio compasses. The range is so good that he can sit in his plane at Scappoose and tune in Seattle, Eugene or The Dalles, all more than 100 miles away. A Bendix manual loop receiver, covering the 200 to 1,750 kc. band, takes over when the ADF is overworked.

His transmitters also include a Bendix which operates on Channels A and B, plus the Narco URA-1 receiver covering the 108 and 122 megacycle bands. This set reaches out 200 miles and more with 200 feet of antenna. His best transmitter, Brandenfels feels, is the 12-watt Harvey Wells job, transmitting 3,105 kc. When there is 200 feet of antenna on this one, it can reach out 200 miles not only in the air, but on the ground. In case of a forced landing, the plane carries a box kite to carry the antenna to its peak altitude. In the event there is not enough wind to raise the kite, a weather balloon and capsules of compressed helium are released to raise the antenna aloft. A Motorola Airboy 200 to 400 kc. receiver and transmitter stands by in case the electrical system conks out leaving the other four sets dead.

The first time he really needed the Airboy was over the Caribbean, just after take-off from Havana and it didn't work at that time because his antenna had been carried away. Never one to get in the same jam twice, Brandenfels now carries a spare antenna which can be attached to the window. He had an immediate chance to test it when he was trying to get into LaGuardia Field on a busy day in marginal weather. The electrical system on the *Widgeon* was out, but he was able to receive landing instructions from the tower on his emergency battery radio and window aerial.

Although all this radio equipment is expensive—it cost about $4,000—it is not gadgetry. The total weight of the complete equipment is 64 pounds, which is considerably less than the weight of the single installation which was originally in the former Navy *Widgeon*.

Business-man Brandenfels has put $30,000 in his plane. Although he gets a kick out of his flying-equipment shop, he feels it is sound safety insurance and a good business investment. The cheapest investment on board is a fifteen cent rubber plunger which takes the place of the wind cone on the end of the trailing antenna.

Being in a financial position not to scrimp on new additions to his plane, he recalls how both engines failed on take-off one sizzling day last summer. He managed to stop the big hull at the end of the runway, traced the trouble to vapor lock, and the next day had electric booster pumps installed in each wing tank.

Despite all precautions, things do happen, but he immediately remedies any threatening situation. When an engine blew a cylinder head on take-off, he had been lucky enough to stagger around the pattern and land. But the way the plane shivered and shook impressed him so deeply, he lost no time in having the wooden propeller replaced by controllable-pitch Hartzell reversables. It not only cleared up the shaking but raised the service ceiling to 14,000 feet, gave him further ground braking power and improved water performance.

Once he was on a safety "insurance" binge, Brandenfels went ahead and installed a CO2 fire extinguisher system, a safety-flight stall warning indicator, and a vent-step in the hull which vastly improves the plane's ability to get up on the step on take-off.

Despite his unusually large financial outlay on safety factors, he is a firm believer that "instruction still is the cheapest form of life insurance." He has taken more than 100 hours of instruction in basic flying, water flying, night navigation, instrument flying and beam work. At one time he employed an instructor for the whole 50 hours of a coast-to-coast tour.

This instruction proved its worth in Chicago when he had called CGA aid to get down through the smog. Since then, he has made dozens of practice letdowns on the ILS beams at Portland and Eugene, using the Narco omni-range receiver tuned to the ILS localizer and his ADF tuned to the outer marker beacon. He flies the *Widgeon* with one hand and his Jepson manual with the other.

Despite all precautions, Brandenfels has not ruled out the possibility of a crash landing some day. So he developed a crash kit that weighs only 20 pounds but still contains 140 items, including pistol, axe and saw, magnifying glass for starting fires, matches, fish hooks and line, nails, screws, signalling mirror, fluorescent balloon, smoke powder, scout knife, whistle, bullion cubes, concentrated vitamins, halizone tablets, tea bags, brandy, dental floss, penicillin, 50 feet of nylon rope, splints and a Mae West. Although the master kit cost $150 to assemble, he plans to prepare it for commercial marketing for $35.

The water wings decorating the Widgeon are not for laughs. A Mae West is an impressive gadget, but try strapping yourself into one after your amphibian water loops on take-off or lands, gear-down, on the water in a back flip. Hence the water wings, which are about the size of a package of cigarettes, but can be inflated by a quick squeeze.

True, Brandenfels has not yet found use for all his elaborate equipment in his 1,500 logged flying hours. But it gives him peace of mind he never found before, as he cruises over desolate stretches of desert and jungle on business and pleasure trips, at which time his wife and two boys join him.

Brandenfels' use of his *Widgeon* is another good demonstration of how the executive-type airplane can be an indispensable aid in conducting a business. END

15 YEARS AGO

FROM the October, 1930 issue of this magazine:

Amelia Earhart plans a solo flight around the world to start soon.

TWA pilots are now known as captains and first officers.

The Porterfield Zephyr is furnished both as an open cockpit or cabin model. It is of the popular parasol type, amply strong for rough landings and provided with very efficient shock absorbers. Its

low price should make it popular with young men who wish to run up time for a transport pilot's license. It sells for $1,295 list.

The Mignet Model HM-18 Flea has a wing spread of 15 feet, weighs 250 pounds and is provided with a 38 h.p. engine. This larger power-plant gives

the plane a forward speed of 100 m.p.h. and climbs to a height of 1,200 feet in two minutes. It has a cruising radius of approximately 400 miles.

The new eight-place Lockheed 12 re-

cently completed at Burbank, Calif., promises to break all existing transport speed records by a wide margin. Powered by two 450 h.p. Pratt and Whitney Wasp Juniors, it has attained a speed of over 250 m.p.h. in initial tests.

Capt. Eddie Rickenbacker, discussing war planes said: "Even 3,000 miles of ocean would be no safeguard against an attack from the air. A ton and a half of poison gas, high explosives or disease bacteria could easily be dropped. Such an attack would be perfectly feasible."

TWENTY YEARS AGO

Airplanes manufactured in the U. S. during the first six months of 1931 totalled 1,606; of which 1,069 were for civil use; 480 for military delivery; and 57 for export. Total number of licensed aircraft in U. S. is 10,235 with 16,268 licensed pilots, according to the Department of Commerce.

Know Your Engine

(Continued from page 31)

Now if an exhaust valve starts to stick because of carbon on the stem, there is only one thing to do: remove the carbon. This can be done without pulling the cylinder on a Continental but it would normally be better to remove the cylinder and make certain the valve seat is O.K. If the engine has only 200 or 300 hours on it, obviously a major is not indicated. If you are close to the 600 hour mark, your decision must be between a top at say $100, or a major at from $200 to $300. Then again, the availability of parts and skilled labor in our present national situation may dictate your decision as to whether or not to do a complete overhaul now.

Let's look at the table of average costs for our four-cylinder, horizontally-opposed engine:

Top, including removal of cylinders, prop, cowl, and with average parts, $95; major, cylinders OK, removal and replacement of engine, $175; major, all cylinders replaced, crankshaft OK, $250; major, replace both the cylinders and crankshaft, $420; factory exchange, including overhaul of accessories and zero time logs, $550.

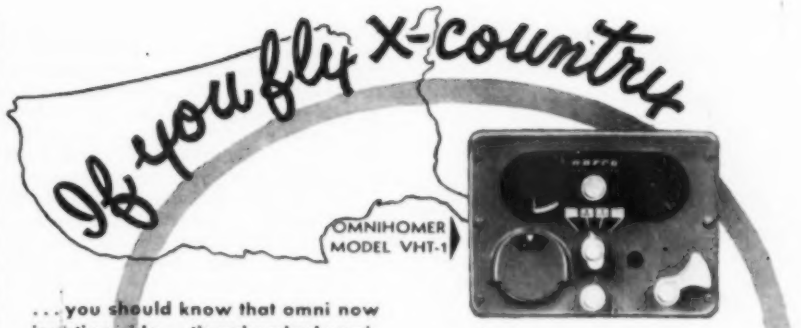
Or suppose you have decided, from symptoms and after consultation with your repair station, that an overhaul is not indicated. The table on pages 30 and 31 will help you to estimate (usually underestimate) your repair costs on a 65 h.p. engine. There will be objections to these cost figures, but no attempt has been made to include aircraft engine operating experience in any climate except the temperature climate and on land with average dust conditions. Prices vary.

I have communicated with a number of engine overhaul agencies, including the three mentioned earlier, and they have checked my technical data and price charts. In order of importance, here are the things they list as contributing to short engine life:

Poor cowling and baffling design or maintenance; operating above rated power; irregular oil changes; improper carburetor maintenance or adjustment; sub-standard ignition system maintenance; substitution of incorrect propeller; and improper octane rating or too great a lead content in fuel.

We hear of unusual cases of engine malfunctioning and take for granted the almost unlimited number of trouble-free hours which these engines afford us. In a couple of thousand hours piloting mostly post-war lightplanes, but including land, sea, scheduled airline and even of late a helicopter, I have yet to experience a complete in-flight engine failure.

This is by no means unusual. It simply means that my engines have been given an even break maintenance-wise. Fortunately, there are mechanics who will do a scrupulous job of safeguarding your life and airplane at a wage which will sell for $3.50 an hour as against the average garage "replace parts deal" labor rate of about $4.50. END



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Leighton Collins, Editor of Air Facts, has logged a comprehensive story, "5000 Miles by Omnigator," in Air Facts Magazine. He states, in summary, "A cross-country exploration and study of our elaborate omni-range and ILS facilities reveal that the system is incredibly good and that, for the first time, the small plane owner has something he can rely on in fair weather or foul, high or low, and especially in thunderstorm areas."

For a complimentary copy of this Omnigator story, write NARCO.

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Shortest Air Line

(Continued from page 25)

oped. As air trips became shorter, the ground rides grew longer.

Clogged highways and poor public transportation caused the to-or-from airport trip to be longer than the actual air trip.

Chicago is obviously not unique in this situation. But, because more than three and a half million air travelers do move through its Midway Airport each year, it represents one of the primary sore spots on the national scene.

It was certainly no isolated wish that "something be done about the situation." Yet, like the old fable of the mice who decided to bell the cat, Mid-Western businessmen could only point to each other—and hope for eventual action.

They could hardly be blamed. Starting anything more pretentious than a corner newsstand in 1950 meant a liberal share of headaches. Yet, to Hugh Riddle, a Chicago mortgage broker, the problem seemed to be a fair challenge to a man's business sense.

In a rather casual way, he began to sound out friends in and around his Highland Park home. The men approached were uniquely qualified to evaluate such a project. First of all, they were either licensed pilots or associated closely with private or commercial aviation. Secondly—and of equal importance—they were singularly successful business executives.

Slowly the idea moved out of the after-dinner stage of conversation into informal meetings in the Loop's financial district where most of the men had their offices. The basic idea was to establish an air shuttle service that would cut the travel time from Chicago's North Shore suburbs to Midway Airport from hours to minutes.

Quite early in the discussions it was decided to limit any potential service to that area for two reasons: (1) the cities in it were entirely residential and air transportation was commonly used; (2) there was an obvious lack of good transportation from them to the Chicago airport. A few quick facts and figures readily underscores this consideration.

The drive between the North Shore towns and Midway Airport had aptly been dubbed the "Battle of Cicero Avenue" by long-suffering wives whose lot it was to chauffeur their husbands. It was generally a one and a half to two hour drive each way through heavy truck and auto traffic. Cab fare was about $7.50, if this alternative was used.

To make the trip via Chicago's downtown district was a feat of split-second timing that challenged even the heartiest traveler. It required catching a suburban train to the Loop, making a dash to the airline's Loop office to meet the limousine and then taking a 30 minute to one hour trip to the airport.

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"The art of flying has been much hurt by air enthusiasts, I admit. There have been too many predictions that have not yet come true. That is why many of us try hard to steer a middle course. But for all my conservatism, I am confident that flying has a future as yet undreamed of, and that in a few years these hot blasts now issuing against it will read as foolishly as do the original arguments against the railway and the automobile." Commdr. Richard E. Byrd, USN, in a debate with Capt. Alfred C. Dewar, published in Forum Magazine, 1928.

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Circumstances involved in an evening or night trip were closely related to an African safari. Suburban trains either stopped running altogether or moved on a local stop schedule. Elapsed time for an odd-hour journey to or from the North Shore could be as much as two or three hours. Sufficient to say that the circumstances made any change quite favorable.

But these obvious conditions alone weren't relied on for evidence. Riddle and his associates contracted for a survey to be made at Midway Airport. Answers to two primary questions were sought: (1) what percentage of airline passengers would use an air shuttle service if it were available and (2) what would be considered a fair price for the flight.

The independent research group polled 200 passengers who lived in the North Shore region as they arrived in Chicago or waited for outbound planes. Better than 50 per cent of the Loop-bound passengers were keenly interested in the idea and were willing to pay between $2 and $8 for a hop to Meigs Field, the downtown landing field. Of those going home, 68 per cent wanted service and estimated the trip to be worth between $4 and $12.

Next step was to present the idea formally to state and city agencies. Joseph K. McLaughlin, director of the Illinois Department of Aeronautics, reported that his group favored authorization and noted that ". . . the service would accommodate the public convenience."

In Chicago, the Aero Commission also endorsed the service. After studying Riddle's organizational plans, the group, headed by Merrill C. Meigs, recommended ". . . quick and positive intervention" by the City Council on behalf of Midway Airlines. In quick order, the influential State Street Council and the Chicago Association of Commerce entered their supporting votes on confidence.

Finally on August 24, Midway Airlines, Inc. applied to the Civil Aeronautics Board for an operating permit based on the issue of ". . . convenience and necessity." A staff of officers and a board of directors were elected as part of the company's official act of incorporation. These men were Hugh Riddle, president; John M. Wilson, vice-president; Burt J. Dickens, Jr., secretary-treasurer; John A. Ames and Budd Mulloy, assistant secretaries; and Robert J. Glasgow, assistant treasurer.

Directors were John D. Ames, Director, Mid-West Division, *Wall Street Journal*; Burt J. Dickens, Jr., of the Burt J. Dickens, Jr. & Company; Henry S. Embree, vice-president, Rittenhouse & Embree Company; Robert J. Glasgow, assistant secretary, Continental Casualty Company; Budd Mulloy of Budd Mulloy and Associates; Harold J. Nutting, vice-president, Marshall Field & Company; George H. Watkins, assistant to the secretary-treasurer, Illinois Commercial Men's Association; Hugh Riddle; John H. Wilson, President, Mid-States Aviation Corporation; James M. Holland and Hardin Masters.

The last two named gentlemen were called into active military service later in the year and so withdrew from the board.

In mid-April of 1951, the Washington counsel for Midway Airlines, Inc., Hardy K. Maclay, enthusiastically wired Hugh Riddle that the CAB had authorized the service. The CAB order, which gives a small carrier the freedom to operate a scheduled run over the same route, is believed to be the first issued. The usual Part 42 regulations of CAB statutes limits the frequency of irregular carriers. However, the government officials considered the Midway project to be of such importance that the exemption was wholeheartedly granted. It served, in effect, as an important measure of encouragement from the CAB.

Thus Midways Airlines, Inc. became the smallest scheduled airline in the U.S. Riddle immediately put through an order for two Cessna 195-A's. The time was drawing near when Chicago's long-sought air commuter service was to be a reality.

Sky Harbor Airport in Northbrook, Ill.

(Continued on page 64)

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I Learned About...

(Continued from page 38)

and all the papers were in order. Since I had promised the owner to have it ready to fly for the coming weekend, I was rather anxious to get it over to Amarillo for inspection. Because there was no phone on the field and I was too lazy to trot to town, I hadn't called Marshall Anderson, the inspector, to have him write out the ferry permit, I figured that if I did go to town, it would make it too late to get to Amarillo, have the airplane inspected and get back before sundown.

"Here I've spent all this time checking this thing," I told myself, "I've fixed everything that needed fixing and I know it's all right. It's not gonna fly a bit better with that paper filled out than it will with it blank."

So, I climbed in and, maybe not fat, but decidedly dumb and happy, took off for Amarillo and inspection.

At lot of us Plains pilots have been spoiled. No matter which direction you glance you see dozens of emergency landing fields, so I get skittish when I see a rock or a clump of trees. Being in an unfamiliar airplane, I decided two or three thousand feet of extra altitude would be advisable, since I would have to cross a few miles of rough country along the Canadian River. It wasn't that I didn't trust that Interstate, but that engine did turn faster than anything I had flown. Also, I thought I heard a new rattle.

* * * * * * * * * * * * * * *

A woman flew 3,000 miles from the Island of Cyprus to have her baby born in Britain. Her sensible explanation: With Britain's free medical service it was cheaper to buy a plane ticket than to pay doctor bills at home.

* * * * * * * * * * * * * * *

"No, huh, uh, your ears just popped from the drop in pressure and that thing is so noisy anyhow." Thus reassuring myself, I settled down in the seat again while time passed.

The airspeed indicator was reading well past 100, why wasn't I making better time? I had been watching that same fence post down there for 10 minutes. It seemed to me that the man on this morning's terminal forecast had said something about the wind getting up. Oh well, I had a minimum of three hours fuel and there would be plenty of people to give me a hand if I had trouble handling the plane on the ground when I got to Amarillo. But the engine sure did feel rough. The oil temperature was getting on up there.

The compass set on top of the instrument panel and began to look as if it had taken up jitterbugging. The card was whirling like a roulette wheel. I was sure that it hadn't done that during the first few minutes of flight. I could see the smoke of Amarillo ahead and didn't figure I was apt to get lost in the next 25 miles.

But what the heck was making that silly thing sit there and shake? I checked the magnetos and there wasn't any worse drop than there had been when I looked before take-off. All four cylinders had to be hitting to make that thing wind up 3,000 r.p.m.

Looking through the swelled outside glasses, I could make a good check on the tail surfaces and wings. All the braces appeared to be anchored securely and the wings looked as solid as could be expected. There was no undue vibration any place else on the dawgone machine. What the heck was the matter with that compass?

Before I talked myself into being scared enough to head back home, I had crossed the worst of the rocky, tree covered Canadian River bottom. The vibration didn't seem to be getting any more severe so I began trading in some of that excess altitude for more speed. The altimeter registered just a shade over 1,000 feet, still unwinding slowly. The Amarillo airport was in sight about six miles ahead.

Suddenly, all my anxieties materialized with a loud "crack". That little vibration had developed into a full scale shattering and shaking of the entire airplane. It nearly loosened the fillings in my teeth in the instant before I could get the switch cut off. My first thought was that the engine mount had given way in spite of my visual inspection for cracks before I took off.

Pastures stretched before me, behind me and to both sides. It was eenie, meenie, miney, moe as to where I should set down—that is if the engine mount didn't let go altogether and drop the engine clear out of there. I had a vivid picture of myself trying to wrestle with an engineless terror, whipstalling to the ground.

A set of car tracks over a bit to the left was the nearest approach to civilization. I set up my pattern to come in beside the trail. I knew I was in for a long walk to the highway but I was plenty willing to start walking right then, believe me! I still had to get that thing on the ground. The pasture was only slightly rolling and looked to be smooth. My ground speed wasn't over 25. But the right wheel dropped into the only hole that was big enough to accommodate it in the whole field. Needless to say, something popped. The plane sagged slowly, until the right wingtip touched the ground.

After climbing out, I went around front to find out the cause of all the static. I opened the cowl gingerly, half expecting the engine to drop out on my toes. I was surprised to find everything apparently in good order. The engine mount showed no signs of breakage and everything was well secured.

I headed around to open the other side for closer scrutiny. As I went around the nose, the obvious answer hit me between the eyes. The spinner was off the propeller. That was my loud crack and my vibration! All four of the propeller attachment bolts were sheared off. I reached up, gave a slight pull and the propeller came off in my hands. Just three more revolutions of that engine and I would have learned what the trouble was before I got to the ground.

The only consolation I had was that I had salvaged the propeller. It wasn't damaged beyond repair. A new landing gear tie rod and four new propeller bolts should fix things up again. Yes, I said *four* bolts. Airplanes which you fly have six bolts holding the propeller on, but an L-6 got shortchanged. If I had made the phone call, as I should have, Marshall could have told me that this has been a source of trouble. I would have learned that smart L-6 operators drill some more holes. They tie that club down with eight bolts.

I'm sure that the moral to this story is obvious to anyone. But just as though that weren't a strong enough lesson for me, the wind got up even stronger before I returned with replacement parts. It pulled out the tie down stakes and sent the poor Interstate on a dainty ballet dance on its wingtips all over half a section of the XL Ranch.

I didn't lose my ticket over it and, I guess more important than that, I wasn't hurt. However, I did lose some money and one of my best customers lost some of his confidence in me. The CAA filed a letter of reprimand which means that if I should ever fly another unlicensed airplane without a ferry permit, things will go a bit hard for me.

You can take my word for it, they don't have to worry. I learned how to adhere to regulations the hard way. END

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Shortest Air Line

(Continued from page 60)

became homebase for the lines. The firm's directors soon found themselves busy with operational "bugs" that are inherent when transforming an idea into an actuality. There was no precedent in the history of American aviation for their activities. The only thing to do was learn the hard way.

Dozens of technical and administrative details were ironed out in the hectic weeks following receipt of the CAB permit. There were questions of legal jurisdiction between inter-state commerce authorities . . . permits, landing fee arrangements . . . movement in and out of Midway . . . transfer of baggage from the regular airliners . . . ticket sales . . . schedules.

Rates at this point were set at $5 plus tax for the one way trip between Sky Harbor and Midway with "commuter" books of 10 rides selling for $50. (No tax was required on these.)

All during this activity, the planning of the company was guided by an important basic concept. It was that the company would proceed slowly in extension of any of its services. Riddle and his colleagues considered public responsibility and dependability a keystone of any future success.

At the time the CAB certificate was granted, the airline was authorized to operate a second run from Midway to Meigs Field, Chicago's downtown landing field. Interest in this jump was high since it gave busy executives easy access to their offices. But the Midway directors voted to stay only with the Northside run at the start. There was much to be learned, they felt, before extending the scope of their activities. Even original flight schedules were closely limited. Full schedules were to wait until customers were acquainted with existing services and technical phases were completely smoothed out.

By summer the plans were in order. Then on Friday, June 29, Riddle proudly greeted a delegation of City, State and Federal officials who, with representatives of the press and Chicago commerce, attended his introductory run. The guests were shuttled around the city in a series of pre-service flights that focussed official recognition on the fledgling line.

The next day, scheduled operations began and the nation's first aerial shuttle service came into being. The paper work and planning now has given way to a closely-knit, personal organization.

Riddle serves as Company President with Warren Baie as his Chief of Operations. Baie flies one of the new Cessnas with Robert D. Winfield at the controls of the second. The trio is, incidentally, "all Navy." Riddle was a Lieutenant Commander in the Navy's Air Transport Service during the war. Baie and Winfield were both Lieutenants. All piloted R5D's and R4D's in the Pacific and are still in the Navy Reserve. Riddle, in fact, was commanding officer of the VR722 Transport Squadron at Glenview Naval Air Station for a period.

Routine maintenance of the planes and CAA-directed periodic checks are handled under contract by Mid-States Aviation Corporation, the Cessna distributor on the field.

At this writing, the original temporary schedule of flights is still in effect. This calls for eight round-trips daily, the first leaving Sky Harbor at 12:20 p.m. and the last getting in from Midway at 8:32 p.m. At the end of eight weeks operations, it is expected that service will be extended to include early morning flights as well.

At the same time, the Meigs Field run will probably be initiated. This is a 13 mile, nine minute run with a $4 fare. To cover this flight, another Cessna has been ordered. Thus, a stand-by ship will cover the flights of the other two.

Application has been made for a license for a company-owned fixed-channel VHF radio station to provide constant two-way communication with the aircraft. Until this comes through, the facilities of Sky Harbor's Uni-Com system is utilized. All ships are equipped with VHF voice transmitters, low-frequency receiver-transmitters, and OMNI range directional receivers.

The need for pilots especially trained in instrument flying and radio procedure is emphasized by the fact that the regular run takes a ship through three aircraft control zones. In the space of 12 minutes, a pilot comes under the jurisdiction of control towers at Glenview Naval Air Station, O'Hare International Airport and Midway Airport.

To facilitate movement through their respective zones, Riddle and his pilots meet on occasion with the tower operators and work out specific questions of traffic control. The Midway tower staff has been unusually cooperative in helping the Cessnas move in and out of the field with a minimum of delay.

The operators are familiar with the fact that the ships have cross-wind landing gear, for example, so the Cessnas are given landing instructions accordingly.

All flying is done in accordance with Visual Flight Rules which call for movement down to "1,000 and one" conditions only. Temporary lighting facilities are used at Sky Harbor for the late evening inbound trips.

Thus one group of enterprising aviation enthusiasts has eliminated a bugaboo that has plagued the industry for almost 10 years. Their solution relates only to their own immediate locale. But the pioneering work they have done will certainly go far towards giving other cities a headstart in initiating similar, much-needed aerial shuttle services. END

A Dog Has His Day

SOON AFTER a new type of transcontinental airliner was put into service, pilots were warned to be especially alert for any signs of fire aboard. One pilot, flying toward Chicago and duly impressed by the warning, wasted no time in releasing the automatic fire extinguisher when a warning light indicated a fire in one of the freight compartments.

A check up moments later revealed that a short circuit in the switch had caused the warning light to blink but this did not help a small dog traveling as freight who more nearly resembled a cake of ice than a Boston Bull.

Spraying carbon dioxide from these extinguishers freezes upon contact, consequently everything in the cargo pit—including the dog—was thoroughly covered with a heavy coating of ice. Hardly able to stand, the dog was carried to the pilots' compartment, wrapped in a blanket and placed near a heater.

By the time the airliner landed, the dog had negotiated a few shaky round trips up and down the aisle, supported by an obliging co-pilot. Still wrapped in a blanket and leaning heavily on a leash, he tottered feebly down the steps from the airplane, pausing for a weak wag of a stubby tail when he reached the ground. A few minutes of more strenuous running up and down the cement ramp and another brisk rub down restored the dog to normal.

Moments later the pilot and dog, walking toward the cargo office, were met by the dog's owner: a buxom, matronly dowager who had arrived in time to witness her beloved's wobbly departure from the airplane. The pilot steeled himself for a severe tongue lashing as he paused for the woman to speak. Instead, the woman crouched beside the dog, gushing words of endearment while the pilot shifted nervously from one foot to the other, awaiting the inevitable upbraiding.

When the woman looked up at him exclaiming: "Oh, you wonderful man! You took such excellent care of my precious Jiggsy, how can I ever thank you enough! Why you even wrapped him in a blanket . . . and exercised him, too!"

—Bernard Gebhardt

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